

FLOOD CONTROL WORK PLAN
AREA A7

SANTA YNEZ RIVER, CALIFORNIA

June 1946

ACCOPRESS BI

NO. BUS 42050

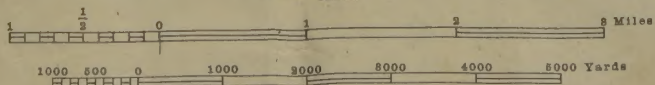
Made by ACCO PRODUCTS
Long Island City, N. Y., U



Prepared under the direction of the Chief of Engineers, U. S. Army, 1942.
Horizontal Control by U. S. Coast and Geodetic Survey, 1933, Fairchild, 1941, and the 29th Engineers, U. S. Army, 1941.
Vertical Control by U. S. Coast and Geodetic Survey, 1924, 1927, 1936, U. S. G. S., 1903-04, U. S. E. D., 1938, and the 29th Engineers, U. S. Army, 1941.
Topography by 29th Engineers, U. S. Army, 1942, utilizing multiplex aero-projects, from Tander T-3A (5-lens) aerial photographs.
Photography by 2nd Photographic Squadron, Air Corps, U. S. Army, 1941.
Polyconic Projection, North American 1927 Datum.

ROAD CLASSIFICATIONS
Dependable hard surface, heavy duty road. ——— U. S. Route 101
Loose surface graded, dry weather road. ——— State Route 1
Secondary, hard surface, all weather road. ———
Unimproved road. ———
More than two lanes indicated by note with tick at point of change.
Road Data 1942

Scale 1/62500



Contour interval 50 feet
Datum is mean sea level (1929 Adj.)

FIVE THOUSAND YARD GRID COMPUTED FROM "GRID SYSTEM FOR PROGRESSIVE MAPS IN THE U. S. ZONE G. U. S. C. & G. S. SPECIAL PUBLICATION NO. 59 (THE LAST THREE DIGITS OF THE GRID NUMBERS ARE OMITTED).
NOTE: OFFICERS USING THIS MAP WILL MAKE PERSON CORRECTIONS AND ADDITIONS WHICH COME TO THEIR ATTENTION AND MAIL DIRECT TO THE CHIEF OF ENGINEERS, WASHINGTON, D. C.



APPROXIMATE MEAN DECLINATION 1942
ANNUAL MAGNETIC CHANGE 0.3° DECREASE

LOMPOC, CALIF.
N3430-W12015/15

Flood Control Planning

SUPPLEMENT TO BLOCK F - 195b Lompoc Soil Conservation District Report
December 1948

Item	Type of Work	Percent Com- pletion	Remarks
A7a 12	Range Treatment	0	
A7a 3,5,9,10,11 13,14,15	Farmland Treatment	62.4	Fields 13,14 & 15 completed = 82 acres
A7a 2-1,2-2,2-3	Channel Cleaning	100.	
A7a 2-1,2-2,2-3	Reinforce Existing structures	93.5	28 of 30 completed
A7a 2-1.1,2-1.2	Const. 2 Gully Structures	100.	
A7a 2	Diversions and Outlets	100.	
A7b 13,33	Rangeland Treatment	0	
A7b, 2,7,8,11, 15,18,20,22, 24,25,27,28, 29,31,36	Farmland Treatment	0	
A7b 3-1.1,1.2, 1.3,1.4	Dams in Main Channel	69	1 dam and 3 breastwall extensions re- maining
A7b 6-1.1, 14-1.1	Head Chutes in Main Channel	100	
A7b 3-1	Temp. P & W Checks	0	
A7b 3-1	Vegetative Planting	0	
A7b 14-1	Reinforce Existing structures	50	5 of 10 completed
A7b 3,6,14	Diversions & Outlets	88	1 field of diversion ditches to do



LEGEND

- Watershed Boundary
- Field Boundary and Number
- Channel Reach and Number
- Proposed Concrete Gully Drop and Number
- Existing Concrete Gully Drop
- Terrace Outlet - Pipe Overfall Type
- Terrace Outlet - Chute Type
- Terrace Type Diversion
- Proposed Watering Trough

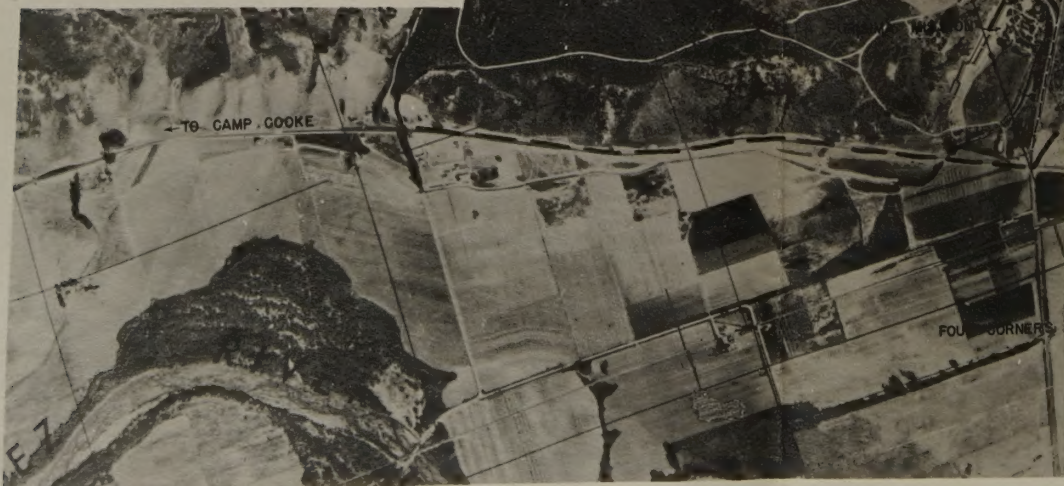


PLATE III PURISIMA CREEK WORK PLAN AREA "A7a" SANTA YNEZ RIVER FLOOD CONTROL PROJECT

LOMPOC SOIL CONSERVATION DISTRICT
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
CALIFORNIA
1946

0 1/2 1 MILE
Approx. Scale

LEGEND

- Watershed Boundary
- Field Boundary and Number
- Channel Reach and Number
- Proposed Earth Fill Dam and Number
- Proposed Head Control Chute and Number
- Existing Concrete Gully Drop
- Terrace Outlet Pipe Overfall Type
- Terrace Outlet Chute Type
- Terrace Type Diversion
- Diversion Dyke



PLATE II

CEBADA CREEK WORK PLAN AREA "A7b" SANTA YNEZ RIVER FLOOD CONTROL PROJECT

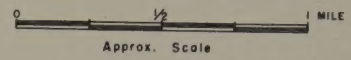
LOMPOC SOIL CONSERVATION DISTRICT
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
CALIFORNIA
1946

Approx. Scale 1/2 MILE

PLATE I

EAST CEBADA CREEK WORK PLAN AREA "A7c" SANTA YNEZ RIVER FLOOD CONTROL PROJECT

LOMPOC SOIL CONSERVATION DISTRICT
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
CALIFORNIA
1946



LEGEND

- Watershed Boundary
- ① Field Boundary and Number
- Channel Reach and Number
- Existing Concrete Gully Drop
- Terrace Outlet - Pipe Overfall Type
- Terrace Outlet - Chute Type
- Terrace Type Diversion
- Pipe and Wire Revetment



LEGEND

-  Watershed Boundary
-  Field Boundary and Number
-  Channel Reach and Number
-  2-1.1 Proposed Concrete Gully Drop and Number
-  Existing Concrete Gully Drop
-  Terrace Outlet - Pipe Overfall Type
-  Terrace Outlet - Chute Type
-  Terrace Type Diversion
-  Proposed Watering Trough

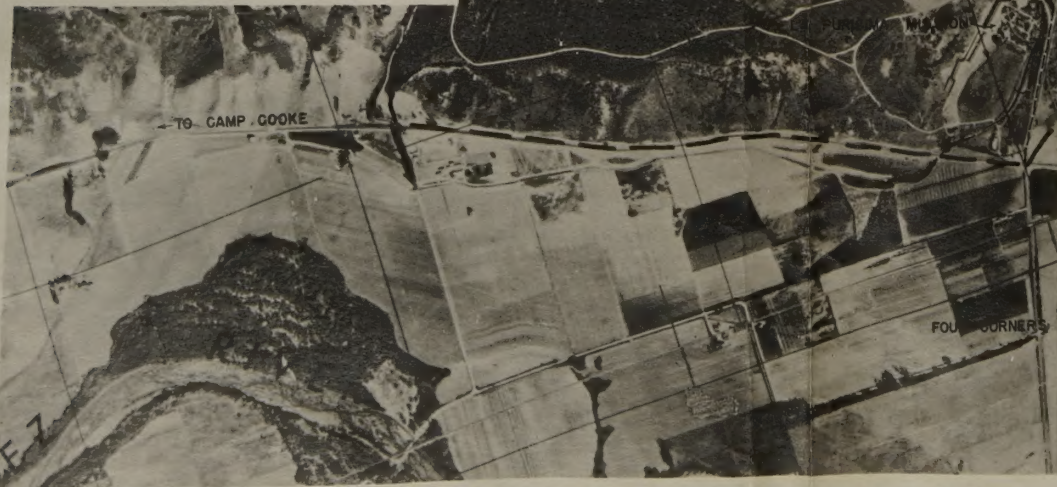
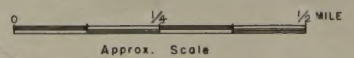


PLATE III
PURISIMA CREEK WORK PLAN AREA "A7a"
SANTA YNEZ RIVER FLOOD CONTROL PROJECT

LOMPOC SOIL CONSERVATION DISTRICT
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
CALIFORNIA
1946



Note: Correct this table as per correction in Sec. Ia and I b

REVISION OF TABLE 6

EXPLANATORY NOTES

Sub-watershed numbers and channel reach numbers referenced to corresponding numbers contained in Table 6 of the Santa Ynez Work Plan, Section 1.

1. "A7a - Pucisima". Cost breakdown has been left unchanged except for an addition of construction engineering item which has been prorated from A7b for those items on which it was estimated.

Work Schedule has been changed to fit recent budget changes.

2. "A7b Cebada and East Cebada B13, 33" has been changed to "A7b Cebada". Items entered under this heading in revised table are those that are planned for Area A7b only. Those items planned in Area A7c have been moved to "A7c East Cebada", and a prorated share of contingencies - \$250.00, construction engineering - \$115.00, and technical supervision - \$400.00, have been deducted from the A7b estimate. Work Schedule has been changed to fit present operations budget.

3. "A7c 1-2, c 1-3 and A7b, Lower Cebada" has been changed to "A7c East Cebada" consistent with sub-watershed delineations contained on Plate I and II of referenced work plan. Cost figures contained in original table under these headings, which were reconnaissance estimates, have been replaced with detailed estimates taken from Table I of work plan A7c1. Also included in this section are the cost estimates taken from the A7b section of the original Table 6 for items of work in the East Cebada area. These items are:

A7c 4, 5, 7, 8, 12, 13 - Farmland Treatment
A7c6 - Diversions and Outlets
A7c 1-4 - Vegetative Plantings (changed to A7c 1-2)
A7c - Technical Supervision (\$400.)
A7c - Contingencies (\$250.)
A7c - Construction Engineering (\$115.)

4. "A3 - San Miguelito" has been changed to "A3a - San Miguelito", subdividing the area between the main channels concerned. Reconnaissance estimate for San Miguelito, contained in the original Table 6, has been taken out and replaced with the detailed cost figures contained in Table 1 of the work plan for San Miguelito Area A3a submitted herewith.
5. "A3 San Pasqual and Rodeo, Bla Santa Rita, Blb Santa Rosa and Blc Palos Blancos". These reconnaissance figures have been entered in the revised table with no change in amounts since no further planning work has been done in these areas and revisions should be withheld until a definite detailed program is compiled. Estimates on Farmland and Rangeland Treatment for this table were taken from the table on page 2 of section 3 of referenced work plan. Checking through this table, it has been found that the Rangeland and Farmland Treatment estimates for

REVISION OF TABLE 2

EXPLANATORY NOTES

1. Sub-watershed numbers and channel reach numbers referred to corresponding numbers contained in Table 2 of the Santa Ynez Work Plan, Section 1. "AYs - Prusheim". Cost breakdown has been left unchanged except for an addition of construction engineering item which has been projected from AYs for those items on which it was estimated.

Work Schedule has been changed to fit recent budget changes.

2. "AYs Cebada and East Cebada B18, 33" has been changed to "AYs Cebada". Items entered under this heading in revised table are those that are planned for Area AYs only. Those items planned in Area AYs have been moved to "AYs East Cebada", and a projected share of contingencies - \$250.00, construction engineering - \$115.00, and technical supervision \$400.00, have been deducted from the AYs estimate. Work Schedule has been changed to fit present operations budget.

3. "AYs 1-2, 3-1-3 and AYs, Lower Cebada" has been changed to "AYs East Cebada" consistent with sub-watershed delineations contained on Plate 1 and 11 of referenced work plan. Cost figures contained in original table under these headings, which were reconnaissance estimates, have been replaced with detailed estimates taken from Table 1 of work plan AYs. Also included in this section are the cost estimates taken from the AYs section of the original Table 2 for items of work in the East Cebada area. These items are:

AYs 4, 5, 7, 8, 12, 13 - Farmstead Treatment
AYs - Diversions and Outlets
AYs 1-4 - Vegetative Plantings (changed to AYs 1-2)
AYs - Technical Supervision (\$400.)
AYs - Contingencies (\$250.)
AYs - Construction Engineering (\$115.)

4. "AYs - San Miguelito" has been changed to "AYs - San Miguelito", subdividing the area between the main channels concerned. Reconnaissance estimate for San Miguelito contained in the original Table 2 has been taken out and replaced with the detailed cost figures contained in Table 1 of the work plan for San Miguelito Area AYs submitted herewith.

5. "AYs San Pascual and Hobee, Elia Santa Rita, Rio Santa Rosa and Rio Pales Blancas". These reconnaissance figures have been entered in the revised table with no change in amounts since no further planning work has been done in these areas and revisions should be withheld until a definite detailed program is completed. Estimates on Farmstead and Rangeland Treatment for this table were taken from the table on page 2 of section 2 of referenced work plan. Checking through this table, it has been found that the Rangeland and Farmstead Treatment estimates for

Area Blb have been interchanged in Table 6. Also the farmer contribution of \$8,700.00 for Area Bla and \$6,850.00 for Area Blb are over and above the estimated cost shown in Table 6 instead of being included; therefore, the notes referring to the farmer contribution in these two areas can be eliminated and the figures remain unchanged. This is consistent with those sections of the table covering the detailed work plans which do not show farmer contributions. Table 6 then shows the distribution of federal costs only.

6. Since we do not have complete cost figures as to what has been charged to the Santa Ynez Flood Control project such as planning, overhead, transportation, etc., no attempt has been made to show these costs on the revised tables. If this breakdown is required, final figures will have to be obtained from the Regional office.

REVISION OF TABLE 3

Area 81b have been interchanged in Table 3. Also the former contribution of \$8,700.00 for Area 81a and \$8,250.00 for Area 81b are over and above the estimated cost shown in Table 3 instead of being included therefore, the notes referring to the former contribution in these two areas can be eliminated and the figures remain unchanged. This is consistent with those sections of the table covering the detailed work plans which do not show former contributions. Table 3 then shows the distribution of federal costs only.

Since we do not have complete cost figures as to what has been charged to the Santa Ynez Flood Control project such as planning, overhead, transportation, etc., no attempt has been made to show these costs on the revised tables. If this breakdown is required, final figures will have to be obtained from the Regional Office.

It is noted that the total cost for the project is \$1,000,000.00. This total cost is the sum of the estimated cost of the project plus the estimated cost of the project. The estimated cost of the project is \$1,000,000.00. The estimated cost of the project is \$1,000,000.00.

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SANTA YNEZ RIVER,

California

FLOOD CONTROL²⁵

WORK PLAN AREA A7¹⁹

Prepared by

Soil Conservation Service

June, 1946

SANTA YNEZ RIVER

FLOOD CONTROL

WORK PLAN AREA 17

Prepared by
Soil Conservation Service
June, 1946

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SANTA YNEZ RIVER WATERSHED

FLOOD CONTROL WORK PLAN

PURISIMA, CEBADA, EAST CEBADA CANYON DRAINAGE

Purpose and scope of work plan

This Flood Control Work Plan has two objectives: First, to provide a basis for integrating work to be carried out in the interest of "runoff and waterflow retardation and soil erosion prevention" with other soil and water conservation activities in the watershed; and second, to provide Service personnel with facts and characteristics on water problems and plans for abatement of flood damages for use in planning and coordinating conservation plans for individual or groups of farms.

General

The Secretary of Agriculture is authorized by the Flood Control Act of June 22, 1936 to prosecute works of importance for measures of runoff and waterflow retardation and soil erosion prevention in aid of flood control on the watershed of the Santa Ynez River in California substantially in accordance with the plans approved by him. The survey report, as approved, is contained in House Document No. 518 of the 78th Congress, second session.

Funds for flood control works on both public and private lands have been provided. The U. S. Forest Service will handle the program on Federal lands which lie mostly within the National Forest, and the Soil Conservation Service, in cooperation with the Lompoc Soil Conservation District, the program on private lands.

The sub-watersheds of the Santa Ynez River in private ownership which have been approved for planning are; San Miguelito, San Pasqual, Rodeo, Purisima, Cebada, Santa Rita, Santa Rosa, and Canada de los Palos Blancos.

The Directors of the Lompoc Soil Conservation District have requested the Soil Conservation Service to study the conservation and flood problems of the Purisima and Cebada sub-watersheds as number one priority. These sub-watersheds were selected inasmuch as the landowners were anxious and willing to cooperate in a flood control program and as the problems are representative of several other above mentioned sub-watersheds of the Santa Ynez River.

Location and description of area

The Purisima, Cebada and East Cebada drainage area (Area A7, Plate Nos. I, II, and III), subwatersheds of the Santa Ynez River watershed, are situated a

SANTA YNES RIVER WATERSHED

FLOOD CONTROL WORK PLAN

PURISIMA, CEBADA, EAST CEBADA CANYON DRAINAGE

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Location and description of area

The Purisima, Cebada and East Cebada drainage areas (Area A, Plate Nos. I, II, and III), subwatersheds of the Santa Ynez River watershed, are situated a

short distance to the northeast of Lompoc, the principle town in the Santa Ynez Valley.

The Purisima, Cebada and East Cebada watersheds comprise an area of about 20 square miles or approximately 12,800 acres. The area extends north from the Santa Ynez River approximately 6 miles to the watershed boundary atop the Purisima hills. It is bounded on the west by the Camp Cooke military reservation and extends approximately 4 miles east to the western boundary of the Santa Rita watershed. The drainage area lies within the boundaries of the Lompoc Soil Conservation District.

The unit is characterized by gently to steeply rolling hills dissected by narrow alluvial valley fills. The drainage system is comprised of the Purisima (Plate I, A7a), Cebada (Plate II, A7b), and East Cebada (Plate III, A7c) canyons and their tributary drainages which head at the watershed boundary to the north and drain southwesterly to the Santa Ynez River, converging at a point known as the Four Corners area. (See Figure 1) At this location they drop the majority of their silt load. The gradient of the canyons is quite steep ($1\frac{1}{2}$ percent) but flattens upon reaching the alluvial broad terraces of the Santa Ynez River valley, causing deposition and other flood damage on those lands adjacent to the mouths of the canyons.

Climate

The climate of the watershed is characterized by mild winters, with light morning frosts and with long dry summers with practically no rainfall. Due to nearness to the ocean, and influence of the west trade winds and frequent ocean fogs, the summers are cool and favor the growing of crops which cannot be grown in warmer sections.

Rainfall

The mean annual precipitation varies from less than 12 inches to the lower valleys to over 17 inches at the higher elevations with an average of approximately 15 inches for the sub-watershed as a whole. Annual precipitation has varied from as low as 6 inches to as much as 40 inches. Precipitation is in the form of rain with about 90 percent of the total annual precipitation occurring during the 6 month period from November 1st to April 30th and over 75 percent normally falling during the winter months from December through March.

Rainfall characteristically occurs in storm periods of 1 to 4 days in length with showers of greatly varying intensities and duration. Rainfall in excess of 4 inches in 24 hours, with rates often exceeding 2 inches per hour for periods of 10 minutes or more, is not uncommon. It is storms of long duration and high intensity occurring after the watershed has been thoroughly wetted by previous rains that produce most of the damaging floods.

short distance to the northeast of Tampoc, the principal town in the Santa Ynez Valley.

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Soils

Soils of the area have been mapped and classified into many soil series and types of greatly varying depth, permeability, texture and fertility.

In general, the foothill and upland soils have been developed on aeolian sands and soft sandstones. The topsoils are predominately sandy in nature varying in depth from less than a foot to as much as five feet. Although relatively permeable, these soils are susceptible to severe soil loss by overland flow particularly when cultivated, burned over or overgrazed and trampled.

Soils of the canyon bottoms are mostly of light texture, deep and unconsolidated. Because of the large amount of runoff that naturally flows down the canyon and of the loose nature of the subsoil and substrata, they are very susceptible to deep gully action and to rapid side and head cutting of the gullies.

For convenience in planning, the many soil series and types have been grouped into standard Land Use Capability Classes as used by the Soil Conservation Service. This system of classification considers such physical factors as soil profile, permeability, slope, and erosion and their relation to the most intensive land use as may be safely practiced. This classification has been made the basis of all recommendations.

Land Use and type of farming

Land in the watershed (Areas A7a, A7b and A7c), amounting to some 12,800 acres, consists of 2,850 acres of cropland, 3,200 acres of grazing land, and 6,770 acres of brushland, and is, for the most part, privately owned and is utilized for agricultural purposes. The type of farming practices is largely governed by topography and availability of irrigation water. Thus, type of farming falls into three broad types; irrigation farming, dry-land farming, and livestock grazing. All three or a combination of two of the types are common within a farming unit.

Irrigation farming (1,370 acres) prevails on the alluvial valley lands (Area A7c-1) which lie between the mouth of the canyons and the Santa Ynez River but is restricted to areas where irrigation water can be pumped from wells. Of recent years additional land has been brought under irrigation as new wells have been drilled. Further development, however, is dependent upon the availability of underground water supplies.

In general, vegetable crops and flower seed production predominate on the lighter soils, while on the heavier soils sugar beets and alfalfa are the usual crops. (See Figure 2)

Dry-land farming (1,530 acres) occurs primarily on the narrow strips of alluvial bottom land extending along the main canyons and on the adjoining foothills. (See Figure 3) The bottom lands, which are the most productive,

Soils

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For convenience in planning, the many soil series and types have been grouped into standard land use capability classes as used by the Soil Conservation Service. This system of classification considers such physical factors as soil profile, permeability, slope, and erosion and their relation to the most intensive land use as may be safely practiced. This classification has been made the basis of all recommendations.

Land Use and type of farming

Land in the watershed (Areas A7a, A7b and A7c), amounting to some 12,800 acres, consists of 2,850 acres of cropland, 3,200 acres of grazing land, and 6,750 acres of brushland, and is, for the most part, privately owned and is utilized for agricultural purposes. The type of farming practices is largely governed by topography and availability of irrigation water. Thus, type of farming falls into three broad types: irrigation farming, dry-land farming, and livestock grazing. All three or a combination of two of the types are common within a farming unit.

Irrigation farming (1,370 acres) prevails on the alluvial valley lands (Area A7c-1) which lie between the mouth of the canyons and the Santa Ynez River but is restricted to areas where irrigation water can be pumped from wells. Of recent years additional land has been brought under irrigation as new wells have been drilled. Further development, however, is dependent upon the availability of underground water supplies.

In general, vegetable crops and flower seed production predominate on the lighter soils, while on the heavier soils sugar beets and alfalfa are the usual crops. (See Figure 2)

Dry-land farming (1,530 acres) occurs primarily on the narrow strips of alluvial bottom land extending along the main canyons and on the adjoining foothills. (See Figure 3) The bottom lands, which are the most productive,

are used for growing lima beans, grain and mustard. On the sloping foothill lands, if the quality of soil allows, a rotation of beans, grain or grain hay and sometimes mustard is a common practice. On the poorer soils, grain or mostly grain hay is rotated with fallow. (See figure 4)

Grazing (3,150 acres) is practiced on the steeper slopes and hillside areas. Vegetative cover is predominately brush consisting of sage, chamise or chaparral-woodland and of value for watershed protection, honey production and wildlife use. Scattered throughout the brushlands are areas in which the cover is predominately of an annual type consisting of grasses and weeds with scattered perennial grasses and other herbaceous vegetation. These areas are used for the grazing of cattle and horses. (See Figures 5 and 6)

Land tenure

Of the 48 ownerships, 36 are held for agricultural purposes and 12 for mineral rights. Of the 36 ownerships, 15 are owner-operated, and 21 are tenant-operated. Rentals for irrigated land are usually cash while dry-farmed land is rented on a share basis. One-third of the crop is commonly asked for the better dry land and one-fourth for the poorer land. Lease agreements are of short terms and provide no guarantee to the tenant of unrealized returns on investments or soil fertility improvements which he may institute. Consequently, the incentive to install improved farming measures is lacking while owners are either not acquainted with the problem or are not in a position to pay for corrective measures. As a result, dry land crops have been limited to the production of beans, or beans and mustard, a practice which depletes the soil and brings about increased soil erosion and runoff.

Flood and erosion problem

The flood and erosion problem manifests itself by (1) deterioration through sedimentation of the rich, highly productive bottomlands lying at the mouths of the canyons, (2) the severe sheet and gully erosion of the hillside cropland, (3) the slow destruction through bank erosion and lateral gullying of the narrow strips of cropland that lie along the entrenched valley channels, (4) over-use of brushland, and (5) periodic inundation and deposition of silt on state and county highways.

Erosion is of minor importance on the Class I, II, and III valley lands lying below the mouth of the canyons due to the very nature of their topography and location. For the same reason, however, certain of these lands are subject to inundation and sedimentation by water and silt coming from the canyons during flood periods. The result is a loss of crops and soil productivity and destruction of irrigation grades. Inasmuch as these lands do not contribute to the flood problem they will not be considered further in this plan.

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Footnote: (See figure 3) The bottom lands, which are the most productive...

The most severe sheet and gully erosion occurs on Class IV, VII, and VIII dry farmed, hillside cropland where predominately soil depleting crops such as beans and mustard are grown. (See Figure 7) Climatic conditions in this area are very favorable to the production of lima beans which, compared to other adaptable dry land crops, have a high value. Climate and crop then have been of prime consideration in determining land use of the dry farmed cropland, whereas the widely varied soil and slope conditions of the land have been largely ignored. The practice of cash crop farming, clean cultivation during the winter months and failure to use all crop residues has greatly reduced the infiltration rate of the soils and has increased runoff and erosion. Since little or no organic matter is returned to the soil in bean growing, and because of the fine soils mulch which exists, the soil becomes less permeable and the surface tends to seal over with the first rain of the season. Close growing crops, such as grain or mustard, protect the soil much better than do row crops. However, these crops give only partial protection since vegetation may be limited when the heavy rains occur and only a part of the soil is covered with vegetation and bound by plant roots.

The return of plant residues will add organic matter as well as give protection to the soil during the winter months. Such a practice combined with improved crop rotations and other agronomic measures will aid in maintaining soil fertility and soil structure and promote the infiltration of water into the soil resulting in less runoff and soil erosion. These practices will constitute the basis for cropland recommendations.

In many cases, some of the more sloping lands, because of cropping practices, have become so badly eroded and depleted of plant nutrients that further cropping became uneconomic. Owners have thus been forced to convert this land to pasture use which produces only a poor to fair growth of annual plants. In some cases, certain areas have been completely abandoned.

On the dry-farmed Class III bottom lands lying along the main canyons, minor sheet and gully erosion, as well as minor deposition, is occurring. This is primarily due to the excess runoff and erosion that originates on the surrounding badly eroded hillside crop and grazing lands.

The rangelands, surrounding the cultivated area, are not overstocked and are not being overgrazed except in a few instances. Distribution of livestock is poor due to lack of water. On certain, highly erodible areas, the effect of grazing and particularly the trampling of livestock tends to aggravate an already serious problem. (See Figure 8)

A common practice among livestock owners is to periodically burn off patches of brushlands in an effort to open up areas, destroy ticks and promote the growth of a more desirable type of forage plants. (See Figure 9) This practice does make the areas more accessible and reduces the tick problem, but increase in forage is negligible. Such a practice temporarily denudes the areas, thus promoting increased runoff and erosion until such time that vegetation is reestablished.

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In Cebada Canyon, the main gully or barranca has washed as much as 60 feet deep and 125 feet wide until at present it occupies an area of 27 acres. (See Figure 10) It is estimated that without remedial measures the barranca will expand until about 154 acres will ultimately be engulfed. The Purisima Canyon barranca involves at present 7 acres of land with an ultimate expected loss of 120 acres unless stabilization measures are installed.

Deposition areas

The main deposition of silt from Purisima, Cebada, and East Cebada occurs in an area known as the Four Corners, located one-half mile south of the La Purisima Mission and three miles northeast of Lompoc. Field observation and measurement indicates that there are 760 acres of fertile, high productive land in the Four Corners area that are subject to deposition. Of this area, 420 acres have been damaged to the extent of having deposition of infertile sand of six inches to six feet. (See Figure 11)

Damage to roads during one winter of heavy rainfall amounted to \$3200 for the state highway for removal of some 8,000 cubic yards of silt, and \$400 for the removal of 1,000 cubic yards from the county highway.

Program objectives

The objective of the program is the retardation of waterflow and prevention of soil erosion, resulting in a lowering of flood peaks and minimizing damage to the bottom lands by inundation and sedimentation. Attainment of this objective will require extensive mechanical treatment such as sediment catchment basins, gully control dams, channel linings, terraces and terrace outlets. In addition, the application of improved soil management practices including better crop rotations, utilization of cover crops and plant residues, and special tillage practices will be necessary. Some cultivated lands should be converted to grazing use, while certain other raw, highly erodible grazing and waste lands should be permanently fenced and retired. Fire control measures will be required to prevent periodic burning of the brushlands which now occurs.

Proposed program of treatment

The program of treatment has been developed on a basis of total treatment needed for the sub-watershed. It is recognized that a part of this total treatment is largely, if not entirely, in aid of erosion control while other parts of the total treatment are in aid of flood control with some minor values to soil erosion control. The distinction between flood control costs and erosion control costs (Public 46) is based on a determination of benefits.

Where the problem damage and benefits can be assessed to an individual farm the costs are also assessed to that farm as an erosion control program.

Where the source of damage is on one or more farms and the resulting damage

In Cebada Canyon, the main gully or baranca has washed as much as 60 feet deep and 125 feet wide until at present it occupies an area of 27 acres. (See Figure 10) It is estimated that without remedial measures the baranca will expand until about 124 acres will ultimately be engulfed. The baranca Canyon baranca involves at present 7 acres of land with an ultimate expected loss of 120 acres unless stabilization measures are installed.

Deposition areas

The main deposition of silt from Purisima, Cebada, and East Cebada occurs in an area known as the Four Corners, located one-half mile south of the La Purisima Mission and three miles northeast of Lompoc. Field observation and measurement indicates that there are 760 acres of fertile, high productive land in the Four Corners area that are subject to deposition. Of this area, 420 acres have been damaged to the extent of having deposition of infertile sand of six inches to six feet. (See Figure 11)

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Proposed program of treatment

The program of treatment has been developed on a basis of total treatment needed for the sub-watershed. It is recognized that a part of this total treatment is largely, if not entirely, in aid of erosion control while other parts of the total treatment are in aid of flood control with some minor values to soil erosion control. The distinction between flood control costs and erosion control costs (Public 66) is based on a determination of benefits.

Where the problem damage and benefits can be assessed to an individual farm the costs are also assessed to that farm as an erosion control program. Where the source of damage is on one or more farms and the resulting damage

is elsewhere, it is considered that the costs of remedial measures is a proper charge to flood control funds.

As an example -- An area of Class VII cultivated land is contributing to the damage of other lands. It is to be seeded and fenced for non-use. The farmer receives no direct benefits justifying an expenditure on his part. However, control of the erosion and runoff from this area is essential to eliminating deposition on other areas which receive the benefits. The work would be considered as in aid of flood control and be paid for from flood control funds.

Adjustments in land use which are determined to be landowner obligations will be accomplished, perpetuated, and maintained through cooperative landowner-Lompoc Soil Conservation District agreements. Maintenance on community controls will be accomplished through a special Storm Drain Maintenance District which will have the power to levy taxes. Easements for the construction and maintenance of community projects will be taken in the name of the Lompoc Soil Conservation District.

Recommendations for farmland

In order to reduce surface runoff and control erosion on cropland areas, certain remedial measures are necessary. Some fields will require only the application of improved crop rotations and cultural practices while on others a complete change in land use is recommended. Field delineations are shown on Plates I, II, and III. The factors in establishing field boundaries were land class, land use, and geographic location; existing fences and ownerships were not considered.

Fields marked A7a2, A7b3, 6 and 14 and A7c6, totaling about 885 acres of Class III land, comprise the canyon bottom dry-farmed lands. These fields are comparatively level (2 percent slope), with deep permeable soils, and are used primarily for the production of lima beans. (See Figures 3 and 10) These lands should be farmed in: (a) a six-year rotation of, alfalfa-grass hay three years and beans three years; (b) a four-year rotation of, one year beans, one year mustard, one year beans and one year oat-vetch hay; or (a) three-year rotations of, one year beans, one year oat-vetch hay, and one year mustard; or one year beans, one year beans, and one year oat-vetch hay.

A volunteer green manure crop should be grown each winter on land on which beans are to be grown next summer and partially incorporated into the surface soil in early spring to check the loss of soil moisture. All crop residues should be spread and stubble mulch tillage practices used. Soils having a texture of loam or heavier should be subsoiled and lighter textured soils basin listed in the early fall when it is planned to grow a bean crop the next summer. Where fields border a barranca, a 10-foot strip of perennial grass which can be cut for hay should be established. Perennial hay crops can be planted in the spring on bean land which has been winter fallowed. Oat and vetch hay crops should be planted following a bean crop with no additional seedbed preparation after bean harvest. Contour cultivation is

is elsewhere, it is considered that the costs of remedial measures is a proper charge to flood control funds. As an example -- An area of Class VII cultivated land is contributing to the damage of other lands. It is to be seeded and fenced for non-use. The farmer receives no direct benefits justifying an expenditure on his part. However, control of the erosion and runoff from this area is essential to eliminating deposition on other areas which receive the benefits. The work would be considered as in aid of flood control and be paid for from flood control funds.

Adjustments in land use which are determined to be landowner obligations will be accomplished, perpetuated, and maintained through cooperative land-owner-Lompoc Soil Conservation District agreements. Maintenance on community controls will be accomplished through a special Storm Drain Maintenance District which will have the power to levy taxes. Assessments for the construction and maintenance of community projects will be taken in the name of the Lompoc Soil Conservation District.

Recommendations for Fairland

In order to reduce surface runoff and control erosion on cropland areas, certain remedial measures are necessary. Some fields will require only the application of improved crop rotations and cultural practices while on others a complete change in land use is recommended. Field delineations are shown on Plates I, II, and III. The factors in establishing field boundaries were land class, land use, and geographic location; existing fences and ownerships were not considered.

Fields marked A7a2, A7b3, 6 and 1A and A7c6, totaling about 885 acres of Class III land, comprise the canyon bottom dry-farmed lands. These fields are comparatively level (2 percent slope), with deep permeable soils, and are used primarily for the production of lima beans. (See Figures 3 and 10) These lands should be farmed in: (a) a six-year rotation of alfalfa-grass hay three years and beans three years; (b) a four-year rotation of, one year beans, one year mustard, one year beans and one year oat-vetch hay; or (a) three-year rotations of, one year beans, one year oat-vetch hay, and one year mustard; or one year beans, one year beans, and one year oat-vetch hay.

A volunteer green manure crop should be grown each winter on land on which beans are to be grown next summer and partially incorporated into the surface soil in early spring to check the loss of soil moisture. All crop residues should be spread and stubble which tillage practices used. Soils having a texture of loam or heavier should be subsoiled and lighter textured soils basin listed in the early fall when it is planned to grow a bean crop the next summer. Where fields border a barranca, a 10-foot strip of perennial grass which can be cut for hay should be established. Perennial hay crops can be planted in the spring on bean land which has been winter fallowed. Oat and vetch hay crops should be planted following a bean crop with no additional seeded preparation after bean harvest. Contour cultivation is

not being recommended because the fields are long and narrow and the establishment of this practice would be difficult and costly.

In addition to cropping practices recommended for these fields, broad base terrace type diversion ditches outletting into the main drainageways are recommended. These diversion ditches will carry excess runoff from the fields and the tributary crop and brushlands to the main drainageways on a non-erosive grade eliminating secondary field gullying. During the period that the SCS-CCC Camp was active in this area, terrace type diversion ditches and outlets were constructed over a part of these fields. Due to lack of maintenance, most of the diversion ditches and approximately half of the outlet structures have failed. To put the diversion ditch system back into operation, as shown on Plates I, II, and III, will require construction of 67,000 feet of diversion ditches and 75 outlet structures. Table 3 shows the construction items, by fields, and the estimated costs of this work. The basis of cost distribution is that Flood Control funds will be used to finance the outlets and half of the cost of ditches. This latter cost will for the most part be in the form of equipment use. Other costs for farm land treatment in these fields, while having flood control benefits, will have sufficient direct benefits to the farm operator to justify the costs without the use of flood control funds. Drawing No. 1 shows type of outlet structures proposed.

Fields A7b10, 17, 23, 26 and 34 and A7c3, totaling approximately 76 acres of Class IVe and VIIe are moderately steep hillside lands bordering the bottom land, and are used primarily for the production of lima beans. (See Figures 4 and 7). The soils are shallow to moderately deep and have a moderate to low permeability. Severe erosion results from continuous cultivation of these lands and they are better suited to hay or pasture crops. The soil should be cultivated only when it is necessary to reestablish the stand of hay or pasture. These lands should be farmed in a long-term rotation such as (A) 1 year grain, 1 year stubble mulch fallow, 3 to 4 years perennial hay crop; or (B) 1 year beans or mustard, 1 year sudan grass, 3 to 4 years perennial hay crop. A cultivated crop, summer mulch fallow or annual close-growing pasture crop will serve to eliminate weed competition for the seeding of a perennial hay crop. All tillage and seeding operations should be as nearly on the contour as possible. Crop residues should be utilized and erosion control tillage practices used when preparing a seedbed for annual crops in a rotation. The practices and method of farming here described will reduce damage of fine sand deposits on immediately adjacent fields below and reduce and retard runoff. The on-site benefits are more than adequate to justify the cost to the farmer.

Fields A7a3, 9, 13, 14, 15, A7b36 and A7c4, 5, and 7, totaling about 225 acres of Class IVe and VIIe land, are also moderately steep hill lands now being cropped to lima beans or cereal hay. These lands are similar in soil characteristics and slope to the Class IVe and VIIe fields mentioned previously, but lie mostly at higher elevations or adjacent to grazing lands. These areas

not being recommended because the fields are long and narrow and the establishment of this practice would be difficult and costly.

In addition to cropping practices recommended for these fields, broad base terrace type diversion ditches outfalling into the main drainageways are recommended. These diversion ditches will carry excess runoff from the fields and the tributary crop and brushlands to the main drainageways on a non-erosive grade eliminating secondary field gullying. During the period that the SCS-CCC Camp was active in this area, terrace type diversion ditches and outlets were constructed over a part of these fields. Due to lack of maintenance, most of the diversion ditches and approximately half of the outlet structures have failed. To put the diversion ditch system back into operation as shown on Plates I, II, and III, will require construction of 67,000 feet of diversion ditches and 75 outlet structures. Table 3 shows the construction items, by fields, and the estimated costs of this work. The basis of cost distribution is that Flood Control funds will be used to finance the outlets and half of the cost of ditches. This latter cost will for the most part be in the form of equipment use. Other costs for farm land treatment in these fields, while having flood control benefits, will have sufficient direct benefits to the farm operator to justify the costs without the use of flood control funds. Drawing No. 1 shows type of outlet structures proposed.

Fields A7B10, 17, 23, 26 and 34 and A7C3, totaling approximately 76 acres of Class IV and VII are moderately steep hillside lands bordering the bottom land, and are used primarily for the production of lima beans. (See Figures 4 and 7). The soils are shallow to moderately deep and have a moderate to low permeability. Severe erosion results from continuous cultivation of these lands and they are better suited to hay or pasture crops. The soil should be cultivated only when it is necessary to reestablish the stand of hay or pasture. These lands should be farmed in a long-term rotation such as (A) 1 year grain, 1 year stubble mulch fallow, 3 to 4 years perennial hay crop; or (B) 1 year beans or mustard, 1 year sudan grass, 3 to 4 years perennial hay crop. A cultivated crop, summer mulch fallow or annual close-growing pasture crop will serve to eliminate weed competition for the seeding of a perennial hay crop. All tillage and seeding operations should be as nearly on the contour as possible. Crop residues should be utilized and erosion control tillage practices used when preparing a seeded for annual crops in a rotation. The practices and method of farming here described will reduce damage of fine sand deposits on immediately adjacent fields below and reduce and retard runoff. The on-site benefits are more than adequate to justify the cost to the farmer.

Fields A7E3, 9, 13, 14, 15, A7B36 and A7C4, 5, and 7, totaling about 225 acres of Class IV and VII land, are also moderately steep hill lands now being cropped to lima beans or cereal hay. These lands are similar in soil characteristics and slope to the Class IV and VII fields mentioned previously, but lie mostly at higher elevations or adjacent to grazing lands. These areas

are not suitable for cultivation and should be seeded to a rangeland type of perennial pasture to be utilized as grazing in connection with adjoining grazing lands. The fields should be stubble mulch fallowed during the summer prior to seeding the grass mixture in the fall. The fields should not be grazed until the perennial pasture is well established. These areas are large contributors to runoff and silt in the main channels from both sheet and gully erosion. In order to offset the crop losses for the first two years during the establishment of usable forage flood control funds will be used to pay the cash costs of the conversion. This expense is justified on the basis of flood control benefits in the downstream areas.

Fields A7a5, 10, and 11; A7b2, 7, 8, 11, 18, 20, 22, 24, 28, 29 and 31; A7c8, 12 and 13, amounting to about 260 acres of Class IVc and VIIc land, are gently sloping or moderately steep lands used primarily for the production of cereal hay or an occasional crop of beans. (See Figure 12). Crop yields are usually low. The soils are very sandy, low in fertility and moisture retention and subject to wind and water erosion. Because of their droughty nature and low fertility, they are not suitable for field crops while the establishment of a perennial cover crop suitable for grazing or sufficient to control erosion is not practical. These lands should be fenced and planted to a mixture of oats and vetch to serve only as watershed protection and conversion to non-use and reestablishment of the natural vegetative cover. The cover crop planted should not be pastured or cut for hay. No benefits to the immediately adjacent fields with major benefits in reducing runoff and silting indicate a cost distribution to flood control funds, as shown in Table 1.

Fields A7b15, 25 and 27, totaling about 40 acres of Class VIIe and VIII lands, represent fields which were once cultivated but because of overuse and severe erosion are now non-productive and have been abandoned. (See Figure 8). In some places natural vegetative cover has reestablished itself and the soil is adequately protected. Other places are badly rilled and gullied and, because of low fertility, low moisture holding capacity, and erosive nature of the soils, are completely bare. Intensive remedial measures will be required in order to reestablish vegetative cover on these areas.

The areas should be fenced so as to exclude the possibility of any future use for agricultural purposes. The erosion pattern on the barren and semi-barren spots should be smoothed out and heavily mulched with straw after which they should be fertilized and seeded to a permanent perennial vegetative cover. In places where vegetative cover is sufficient that the soil is adequately protected, no further remedial measures will be required. This conversion to complete non-use reduces and retards runoff, and in time eliminates this source of silt. Since the benefits are of a community type and the immediate result of the program represent a loss to the farmer, all costs of the conversion will be borne by flood control funds.

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Fields A7c5, 10, and 11; A7b2, 7, 8, 11, 18, 20, 22, 24, 28, 29 and 31; A7c8, 12 and 13, amounting to about 260 acres of Class IVc and VIIc lands, are gently sloping or moderately steep lands used primarily for the production of cereal hay or an occasional crop of beans. (See Figure 12). Crop fields are usually low. The soils are very sandy, low in fertility and moisture retention and subject to wind and water erosion. Because of their droughty nature and low fertility, they are not suitable for field crops while the establishment of a perennial cover crop suitable for grazing or sufficient to control erosion is not practical. These lands should be fenced and planted to a mixture of oats and vetch to serve only as watershed protection and conversion to non-use and reestablishment of the natural vegetative cover. The cover crop planted should not be pastured or cut for hay. No benefits to the immediately adjacent fields with major benefits in reducing runoff and silt indicate a cost distribution to flood control funds, as shown in Table I.

Fields A7b12, 25 and 27, totaling about 40 acres of Class VIIc and VIII lands, represent fields which were once cultivated but because of overuse and severe erosion are now non-productive and have been abandoned. (See Figure 8). In some places natural vegetative cover has reestablished itself and the soil is adequately protected. Other places are badly rilled and gullied and, because of low fertility, low moisture holding capacity, and erosive nature of the soils, are completely bare. Intensive remedial measures will be required in order to reestablish vegetative cover on these areas.

The areas should be fenced so as to exclude the possibility of any future use for agricultural purposes. The erosion pattern on the barren and semi-barren spots should be smoothed out and heavily mulched with straw after which they should be fertilized and seeded to a permanent perennial vegetative cover. In places where vegetative cover is sufficient that the soil is adequately protected, no further remedial measures will be required. This conversion to complete non-use reduces and retards runoff, and in time eliminates this source of silt. Since the benefits are of a community type and the immediate result of the program represent a loss to the farmer, all costs of the conversion will be borne by flood control funds.

The Lompoc Soil Conservation District Governing Body recognizes the value of this program on the lands of the watersheds and will aid in getting it established through an active educational program and by providing such technical assistance and equipment as is available to it.

See Table No. 1 for the distribution of costs.

Recommendations for rangeland

The Purisima watershed area consists of some 5000 acres of which approximately 560 acres are in cultivation, 360 acres in grazing and 4080 acres in dense brush of no grazing value. (See Figure 5). The range types are brush with annual grass, weed and perennial grass in poor range condition.

The Cebada watershed area consists of some 4280 acres of which approximately 660 acres are in cultivation, 1170 acres in grazing and 2450 acres are in dense brush and not suitable for grazing. The range types are brush with annual grass, weeds and perennial grass in poor to fair range condition.

The East Cebada drainage area consists of some 3530 acres of which approximately 1630 acres are in cultivation, 1660 acres in grazing and 240 acres in dense brush. The range area is primarily of the annual grass-weed type with some scattered brush and varies in range condition from poor to fair.

In all three drainages, bordering the cultivated land and in isolated locations, there are small parcels of land varying from five to about fifty acres which were once under cultivation but due to excessive gullying and loss of fertility are now in non-use or used as pasture. Most of these areas have reverted to brush, annual grass and weeds and are in poor to very poor range condition. The condition of these parcels of land is not a reflection of grazing use, but past agricultural abuse. It is recommended that such areas remain out of cultivation. Some areas can be stocked where water is available but 3 to 7 acres will be required per AUM.

The watershed fields shown by the symbols A7a1, 4, 6, 7, and 8 and A7b5, 12 and 30 are brush covered and of value for watershed protection, honey production, wildlife and recreation use. It is recommended that these areas remain in present use and be given adequate fire protection.

The fields shown as A7a16 and A7b1 are composed of brushland and holding pastures for a dairy operation. The holding pastures are excessively used, trampled and in very poor condition. It is recommended that feedlots be constructed at farmer's expense for feeding dairy herd and that the present pastures be stocked very lightly pending improvement in their condition.

The field marked by symbol A7a12 includes the watershed area of the east branch of Purisima Canyon. It is divided by a fence which corresponds to the northern boundary line of the Lompoc Soil Conservation District. Between the north boundary of the district and the watershed boundary there are three use units which are overgrazed and in poor condition. It is recommended

The Lompoc Soil Conservation District Governing Body recognizes the value of this program on the lands of the watershed and will aid in getting it established through an active educational program and by providing such technical assistance and equipment as is available to it.

See Table No. I for the distribution of costs.

Recommendations for rangeland

The Purisma watershed area consists of some 7000 acres of which approximately 500 acres are in cultivation, 300 acres in grazing and 4080 acres in dense brush of no grazing value. (See Figure 2). The range types are brush with annual grass, weed and perennial grass in poor range condition.

The Cebada watershed area consists of some 4280 acres of which approximately 600 acres are in cultivation, 1170 acres in grazing and 2450 acres are in dense brush and not suitable for grazing. The range types are brush with annual grass, weeds and perennial grass in poor to fair range condition.

The East Cebada drainage area consists of some 3230 acres of which approximately 1630 acres are in cultivation, 1000 acres in grazing and 240 acres in dense brush. The range area is primarily of the annual grass-weed type with some scattered brush and varies in range condition from poor to fair.

In all three drainages, bordering the cultivated land and in isolated locations, there are small parcels of land varying from five to about fifty acres which were once under cultivation but due to excessive gullying and loss of fertility are now in non-use or used as pasture. Most of these areas have reverted to brush, annual grass and weeds and are in poor to very poor range condition. The condition of these parcels of land is not a reflection of grazing use, but past agricultural abuse. It is recommended that such areas remain out of cultivation. Some areas can be stocked where water is available but 3 to 7 acres will be required per AUM.

The watershed fields shown by the symbols A7a1, 4, 6, 7, and 8 and A7b5, 12 and 30 are brush covered and of value for watershed protection, honey production, wildlife and recreation use. It is recommended that these areas remain in present use and be given adequate fire protection.

The fields shown as A7a1 and A7b1 are composed of brushland and holding pastures for a dairy operation. The holding pastures are excessively used, trampled and in very poor condition. It is recommended that feedlots be constructed at farmer's expense for feeding dairy herd and that the present pastures be stocked very lightly pending improvement in their condition.

The field marked by symbol A7a12 includes the watershed area of the east branch of Purisma Canyon. It is divided by a fence which corresponds to the northern boundary line of the Lompoc Soil Conservation District. Between the north boundary of the district and the watershed boundary there are three use units which are overgrazed and in poor condition. It is recommended

that cattle be kept off these units until after the annual grasses and weeds have reached a height of 3 to 4 inches; that the fenced units be rotated in use; and that stocking be based on approximately five acres per AUM pending improvement of the range condition. It is recommended that the portion of field A7a12 within the district be operated as a one-use unit. Within this area there are two fields now under cultivation. The conversion of these cultivated fields to permanent pasture is recommended. Existing fences will permit their protection until the permanent pastures are established and will also permit rotational grazing, if stock water can be developed. Water development for field A7a14 is not practical, but two developments as shown by 1 and 2 are advised if water can be obtained from existing oil company pipeline outside the district. Such development would require about 1200 feet of pipe and two troughs. Grazing of this unit should not commence until annual grasses and weeds have reached a height of from 3 to 4 inches. The stocking rate should be at about five acres per AUM. Most of the grazing area is brush mixed with annual grasses and weeds and some perennial grass. Its present condition is poor. A small area of annual grass and weeds, which occurs in this area, was checked for forage production by clipping an unused sample plot. The yield was found to be 700 pounds of air dry feed over and above an allowance of 600 pounds of residue necessary for range improvement, erosion control, and watershed protection. Of the 700 pounds, only 25 percent were desirable forage plants.

Fields A7b4, 6, and 21 which border Cebada Canyon to the east are mostly brush covered. Several types of woodland brush with annual grasses and weeds and some perennials were delineated which provide limited grazing at the rate of 5 to 7 acres per AUM. Stock water is available. Recent attempts to open up the brush area through burning has not materially improved it from a grazing viewpoint. Burned areas are temporarily accessible but forage is almost lacking. The practice of burning should be discontinued.

Field A7b5 is an enclosed field with about one-fourth of its area available for grazing at the rate of about 5 acres per AUM. Stock water is available. Livestock should be kept off the field until annual grasses and weeds have reached a height of 3 to 4 inches.

Field A7b13 comprises the upper watershed of Martin Canyon. Forage is available in brush, grass and weed types. The only available stock water is located in the canyon bottom. The steepness of the surrounding slopes cause excessive trailing and trampling along the canyon bottom. It is recommended that three fence barriers, requiring about 300 feet of fencing, be constructed across the canyon bottom at locations which would force the cattle up on the slopes. Grazing should be based on about 7 acres per AUM and not before the annual grasses and weeds are 3 to 4 inches high.

Fields A7b39 and 40 are used as part of larger grazing units outside the watershed. Present intensity of use is not contributing to the flood control problems of Cebada Canyon. It is recommended that present grazing practices be continued.

that cattle be kept off these units until after the annual grasses and weeds have reached a height of 3 to 4 inches; that the fenced units be rotated in use; and that stocking be based on approximately five acres per AUM pending improvement of the range condition. It is recommended that the portion of field A7A12 within the district be operated as a one-use unit. Within this area there are two fields now under cultivation. The conversion of these cultivated fields to permanent pasture is recommended. Existing fences will permit their protection until the permanent pastures are established and will also permit rotational grazing, if stock water can be developed. Water development for field A7A14 is not practical, but two developments are shown by 1 and 2 are advised if water can be obtained from existing oil company pipeline outside the district. Such development would require about 1200 feet of pipe and two troughs. Grazing of this unit should not commence until annual grasses and weeds have reached a height of from 3 to 4 inches. The stocking rate should be at about five acres per AUM. Most of the grazing area is brush mixed with annual grasses and weeds and some perennial grass. The present condition is poor. A small area of annual grass and weeds, which occurs in this area, was checked for forage production by clipping an unused sample plot. The yield was found to be 700 pounds of air dry feed over and above an allowance of 600 pounds of residue necessary for range improvement, erosion control, and watershed protection. Of the 700 pounds, only 25 percent were desirable forage plants.

Fields A7B4, 6, and 21 which border Cebada Canyon to the east are mostly brush covered. Several types of woodland brush with annual grasses and weeds and some perennials were delineated which provide limited grazing at the rate of 2 to 7 acres per AUM. Stock water is available. Recent attempts to open up the brush area through burning has not materially improved it from a grazing viewpoint. Burned areas are temporarily accessible but forage is almost lacking. The practice of burning should be discontinued.

Field A7B5 is an enclosed field with about one-fourth of its area available for grazing at the rate of about 5 acres per AUM. Stock water is available. Livestock should be kept off the field until annual grasses and weeds have reached a height of 3 to 4 inches.

Field A7B13 comprises the upper watershed of Martin Canyon. Forage is available in brush, grass and weed types. The only available stock water is located in the canyon bottom. The steepness of the surrounding slopes causes excessive trampling and trampling along the canyon bottom. It is recommended that three fence barriers, requiring about 300 feet of fencing, be constructed across the canyon bottom at locations which would force the cattle up on the slopes. Grazing should be based on about 7 acres per AUM and not before the annual grasses and weeds are 3 to 4 inches high.

Fields A7B29 and 40 are used as part of larger grazing units outside the watershed. Present intensity of use is not contributing to the flood control problems of Cebada Canyon. It is recommended that present grazing practices be continued.

Fields A7b32, 33, 35, 37 and 38 comprise the grazing area of the upper watershed of Cebada Canyon. An annual grass-weed type and a brush-grass-weed type provide the available forage. The present condition is not the result of recent range use but cultivation in the past. A clipping check was made on an unused sample plot and it was found that 2000 pounds of air dry feed was produced over and above an allowance of 600 pounds of residue necessary for range improvement, watershed protection and erosion control. Of the 2000 pounds, only 33 percent consisted of desirable forage plants.

The source of stock water for field A7b33 is located in a badly eroded area. This eroded area is the result of oil field roads, stock trampling and geologic erosion. Total exclusion is recommended for the eroded area by fencing and use of natural barriers. A fenced stock driveway to water in this exclusion area will be necessary since water development on adjacent range area is not practical. The exclusion area plus stock driveway fencing will require construction of about 19,000 feet of fence.

The practice of rotational grazing of the fields in this upper Cebada area is recommended. Stocking should be at the rate of from 3 to 5 acres per AUM. Livestock should not be permitted on the range until the annual grasses and weeds have reached a height of from 3 to 4 inches.

Field A7c11 is that part of the drainage area in East Cebada to the north of the Lompoc-Buellton highway. The range described areas are in very poor condition. The present condition is primarily due to past cultivation with resultant deterioration and gullying. Recommendations consist of regulation of stocking at rate of 5 to 7 acres per AUM and rotation of existing fenced fields. Stock should not be permitted to graze the pasture areas until the annual grasses and weeds have attained a height of 3 to 4 inches. It is expected that some of the poorer sites will revert to brush.

Fields A7c2 and 9 comprise that part of the drainage area south of the Lompoc-Buellton highway. This area, except for the cultivated land, is used for pasture. The condition of the pastures varies from poor to fair. Those pastures nearest the farm developments are heavily grazed by dairy and beef cattle. The outlying pastures are in better condition. It is recommended that the pastures in poor condition be rotated in use and that small feedlots be constructed for use during periods of supplemental feeding. The present practice of supplemental feeding in the pasture areas causes overuse and excessive trampling with soil compaction and heavy runoff. Stocking on the pastures should be at about 3 acres per AUM pending range condition improvement. Use should not be permitted until annuals have reached a height of 3 to 4 inches. Existing fences should permit rotation in use of the pasture areas.

Field A7c10 is in poor range condition but proper practices are now in effect and improvement is expected. See Table 2 for the distribution of costs.

Fields A7b32, 33, 35, 37 and 38 comprise the grazing area of the upper watershed of Cebada Canyon. An annual grass-weed type and a brush-grass-weed type provide the available forage. The present condition is not the result of recent range use but cultivation in the past. A clipping check was made on an unused sample plot and it was found that 2000 pounds of air dry feed was produced over and above an allowance of 600 pounds of residue necessary for range improvement, watershed protection and erosion control. Of the 2000 pounds, only 33 percent consisted of desirable forage plants.

The source of stock water for field A7b33 is located in a badly eroded area. This eroded area is the result of old field roads, stock trampling and geologic erosion. Total exclusion is recommended for the eroded area by fencing and use of natural barriers. A fenced stock driveway to water in this exclusion area will be necessary since water development on adjacent range areas is not practical. The exclusion area plus stock driveway fencing will require construction of about 10,000 feet of fence.

The practice of rotational grazing of the fields in this upper Cebada area is recommended. Stocking should be at the rate of from 3 to 5 acres per AUM. Livestock should not be permitted on the range until the annual grasses and weeds have reached a height of from 3 to 4 inches.

Field A7c11 is that part of the drainage area in East Cebada to the north of the Lompo-Buellton highway. The range described areas are in very poor condition. The present condition is primarily due to past cultivation with resultant deterioration and gullying. Recommendations consist of regulation of stocking at rate of 5 to 7 acres per AUM and rotation of existing fenced fields. Stock should not be permitted to graze the pasture areas until the annual grasses and weeds have attained a height of 3 to 4 inches. It is expected that some of the poorer sites will revert to brush.

Fields A7c2 and 9 comprise that part of the drainage area south of the Lompo-Buellton highway. This area, except for the cultivated land, is used for pasture. The condition of the pastures varies from poor to fair. Those pastures nearest the farm developments are heavily grazed by dairy and beef cattle. The outlying pastures are in better condition. It is recommended that the pastures in poor condition be rotated in use and that small feedlots be constructed for use during periods of supplemental feeding. The present practice of supplemental feeding in the pasture areas causes overuse and excessive trampling with soil compaction and heavy runoff. Stocking on the pastures should be at about 3 acres per AUM pending range condition improvement. Use should not be permitted until annuals have reached a height of 3 to 4 inches. Existing fences should permit rotation in use of the pasture areas.

Field A7c10 is in poor range condition but proper practices are now in effect and improvement is expected. See Table 2 for the distribution of costs.

The range practices and the construction included will be of little immediate benefit to the users of this land but are to be applied for their value in reducing and retarding runoff and soil loss in aid of flood control. An extensive acreage of this land is owned by oil companies who lease it to local farmers. These companies are sympathetic to the programs of Soil Conservation and Flood Control. It is expected that they will, through clauses in future leases, aid considerably in effectuating the changes in land use. It is doubtful, however, that they will make much of a cash contribution toward either program other than in more favorable lease provisions.

The Soil Conservation District will carry on a vigorous educational program against the present practice of burning brushy mountain land as a forage production measure.

Runoff Disposal system

Purisima Watershed: Plate I shows existing and proposed improvements to the main drainageways of Purisima Canyon. The 90 existing channel drop structures were constructed by the SCS-CCC Camp as part of the cooperative agreements entered into with various landowners. These structures have stabilized the channel grade and have arrested development of this channel. These drop structures were constructed as conservation measures to carry runoff expected once every 8 to 10 years and are not adequate to carry floods expected once in 50 years on which the USDA Survey Report on the Santa Ynez River based its damages and benefits. Due to the extensiveness of the present gully control system, it is not economically feasible to reconstruct for the lower frequency floods. For this reason local people would not support a program of replacement except when failure necessitates it. We have assumed that during a 50 year period all of these structures will fail through lack of capacity or at an average rate of 2 each year. The replacements should be included in the maintenance cost after the end of the construction period. Channel work recommended for this watershed consists of installation of two additional drop structures to replace structures which have failed because of lack of maintenance (see Figures 13 and 14), reinforcement of 23 existing drop structures and channel cleaning of 24,500 feet of channel to insure channel capacity consistent with the capacity of the structures. Table 4 shows construction items, estimated costs and symbol designations as referred to symbols on Plate I. Drawing No. 1 shows type of drop structure and reinforcement to existing drops that are proposed.

Upper Gebada Watershed: Plate II shows existing and proposed improvements to the main drainageways of Gebada Canyon. The 63 existing channel drop structures and two existing head control structures (see Figures 15 and 16) were constructed by the SCS-CCC Camp as a part of the cooperative agreements entered into with the various landowners. These structures have arrested development of the main gullies and stabilized the channel grade. Existing structures were constructed as conservation measures to carry runoff expected once every 8 to 10 years and are not adequate to carry runoff expected once in 50 years. Reference is made to USDA Survey Report on the Santa Ynez River.

The range practices and the construction included will be of little immediate benefit to the users of this land but are to be applied for their value in reducing and retarding runoff and soil loss in aid of flood control. An extensive acreage of this land is owned by oil companies who lease it to local farmers. These companies are sympathetic to the program of Soil Conservation and Flood Control. It is expected that they will, through clauses in future leases, aid considerably in effectuating the changes in land use. It is doubtful, however, that they will make much of a cash contribution toward either program other than in more favorable lease provisions.

The Soil Conservation District will carry on a vigorous educational program against the present practice of burning brushy mountain land as a forage production measure.

Runoff Disposal System

Purisma Watershed: Plate I shows existing and proposed improvements to the main drainageways of Purisma Canyon. The 90 existing channel drop structures were constructed by the SCS-CCC Camp as part of the cooperative agreements entered into with various landowners. These structures have stabilized the channel grade and have arrested development of this channel. These drop structures were constructed as conservation measures to carry runoff expected once every 8 to 10 years and are not adequate to carry floods expected once in 50 years on which the USDA Survey Report on the Santa Ynez River based its damages and benefits. Due to the extensiveness of the present gully control system, it is not economically feasible to reconstruct for the lower frequency floods. For this reason local people would not support a program of replacement except when failure necessitates it. We have assumed that during a 50 year period all of these structures will fail through lack of capacity or at an average rate of 2 each year. The replacements should be included in the maintenance cost after the end of the construction period. Channel work recommended for this watershed consists of installation of two additional drop structures to replace structures which have failed because of lack of maintenance (see Figures 13 and 14), reinforcement of 23 existing drop structures and channel cleaning of 24,500 feet of channel to insure channel capacity consistent with the capacity of the structures. Table A shows construction items, estimated costs and symbol designations as referred to symbols on Plate I. Drawing No. 1 shows type of drop structure and reinforcement to existing drops that are proposed.

Upper Cebada Watershed: Plate II shows existing and proposed improvements to the main drainageways of Cebada Canyon. The 63 existing channel drop structures and two existing head control structures (see Figures 15 and 16) were constructed by the SCS-CCC Camp as a part of the cooperative agreements entered into with the various landowners. These structures have arrested development of the main gullies and stabilized the channel grade. Existing structures were constructed as conservation measures to carry runoff expected once every 8 to 10 years and are not adequate to carry runoff expected once in 50 years. Reference is made to USDA Survey Report on the Santa Ynez River.

Due to the extensiveness of the existing gully control system and its effective operation during the past 10 years, it is not considered economically feasible to reconstruct the existing channel drop structures for the lower frequency floods. The two existing head control structures have arrested the head progression of channel reach 3-1, (see Plate II), which is in an advanced stage of development. Overtopping and subsequent failure of these two structures by floods expected once in 50 years would result in rapid head recession and accelerated deposition on the valley bottom lands below the mouth of Cebada Canyon as well as progressive failure of existing drop structures through grade recession. Based on these considerations, it is recommended that existing head control structures be removed and replaced by head control chutes of adequate capacity. Details of proposed chutes are shown in Drawing No. 2.

Channel reach 3-1 includes that section of the Cebada barranca that is in an advanced stage of development. The barranca flow line grade is excessive and is down cutting rapidly. This, together with lateral cutting and sloughing of excessively steep banks is producing the majority of the sediment being deposited by the Cebada Watershed on the valley bottomland below its mouth. (See attached supplement on sedimentation.) To alleviate this sedimentation problem and to arrest further barranca development, it is recommended that two earth-fill dams, 37 feet and 40 feet net height, be constructed to form debris basins in this barranca section. (See Figure 17). These dams will impound an estimated 153.5 acre feet of silt, stabilize the flowline grade, cover a part of the unstable barranca banks and form a stable silt line on which vegetation controls can be installed as bank protection for the final channel section. Since it is estimated that the major portion of debris coming from the Cebada Watershed is being removed from this channel reach, control and siltation of this channel section is estimated to eliminate essentially all of the sediment this watershed contributes to the Four Corners deposition area. No removal of debris is anticipated to be necessary from behind these proposed structures. Details of proposed earth-fill dams are shown on Drawings Nos. 3 and 4. Drawing No. 5 shows the profile of this channel reach and location of proposed head structures and earth-fill dams. Table 4 tabulates construction items, and estimated costs for construction of these controls. Symbol designations of these structures are shown in the table and reference to symbols on Plate II.

Consideration was given to two alternates in the lower gully for stabilization of the channel bottom and reduction of silt load.

1. Two earth fill dams, total lift of 77' with drop inlet spillway.
2. Take up 60' of vertical distance by low concrete drops of 10' each.

These alternates were discussed with Mr. Kohler, Regional Engineer and Mr. Kimball of the Washington office on the ground and with representatives of the California State Engineers office.

In arriving at a decision as to which of these alternates would most effectively solve the problem consideration was given to the source of silt. The major silt contribution comes from bank caving and a minor part from bottom cutting.

Due to the extensiveness of the existing gully control system and its effective operation during the past 10 years, it is not considered economically feasible to reconstruct the existing channel drop structures for the lower frequency floods. The two existing head control structures have arrested the head progression of channel reach 3-1, (see Plate II), which is in an advanced stage of development. Overtopping and subsequent failure of these two structures by floods expected once in 50 years would result in rapid head recession and accelerated deposition on the valley bottom lands below the mouth of Cebada Canyon as well as progressive failure of existing drop structures through grade recession. Based on these considerations, it is recommended that existing head control structures be removed and replaced by head control chutes of adequate capacity. Details of proposed chutes are shown in Drawing No. 2.

Channel reach 3-1 includes that section of the Cebada River that is in an advanced stage of development. The river flow line grade is excessive and is down cutting rapidly. This, together with lateral cutting and sloughing of excessively steep banks is producing the majority of the sediment being deposited by the Cebada Watershed on the valley bottomland below the mouth. (See attached supplement on sedimentation). To alleviate this sedimentation problem and to arrest further riverbank development, it is recommended that two earth-fill dams, 37 feet and 40 feet net height, be constructed to form debris basins in this river section. (See Figure 1). These dams will impound an estimated 153.5 acre feet of silt, stabilize the flowline grade, cover a part of the unstable riverbanks and form a stable silt line on which vegetation controls can be installed as bank protection for the final channel section. Since it is estimated that the major portion of debris coming from the Cebada Watershed is being removed from this channel reach, control and siltation of this channel section is estimated to eliminate essentially all of the sediment this watershed contributes to the Four Corners deposition area. No removal of debris is anticipated to be necessary from behind these proposed structures. Details of proposed earth-fill dams are shown on Drawings Nos. 3 and 4. Drawing No. 5 shows the profile of this channel reach and location of proposed head structures and earth-fill dams. Table 4 tabulates construction items, and estimated costs for construction of these controls. Symbol designations of these structures are shown in the table and reference to symbols on Plate II.

Consideration was given to two alternatives in the lower gully for stabilization of the channel bottom and reduction of silt load.

1. Two earth fill dams, total lift of 77' with drop inlet spillway.
2. Take up 60' of vertical distance by low concrete drops of 10' each.

These alternatives were discussed with Mr. Kohler, Regional Engineer and Mr. Kimball of the Washington office on the ground and with representatives of the California State Engineers Office. It was decided that the most effective solution was to arrive at a decision as to which of these alternatives would most effectively solve the problem consideration was given to the source of silt. The major silt contribution comes from bank caving and a minor part from bottom cutting.

The low dams would cost approximately $\frac{2}{3}$ that of the high dams and would stabilize the channel bottom but would be of no value in preventing side cutting and only slightly reduce the quantity of silt produced. The low drops would provide no appreciable debris storage.

The high dams would provide silt storage for a number of years and raise the channel level through much of the gully area to a point where side stabilization by vegetation will be possible. Through side stabilization and debris storage much of the silt problem in this area can be solved.

Lower Cebada Watershed: The deposition areas included in Field A7c1 (Plate III) include both the Cebada and Purisima deposition cones. Both the Cebada and Purisima Channels become shallow and inadequate shortly after they cross under the Camp Cooke-Buellton highway. Flood flows from both canyons spread out over this field as they pass on to the river depositing most of their silt load and inundating irrigated cropland. Preliminary engineering investigation was made for improved channels to the Santa Ynez River from the canyon mouths handling the flows separately and combined.

It is proposed that structural measures for both watersheds be installed which, in conjunction with the cropping practices and rangeland treatment recommended, will eliminate an estimated 80 percent of the debris that is presently being deposited on the bottomland. (See attached supplement on deposition). It is recognized that the debris free water flowing over these silt cones will tend to spread presently deposited silt over additional areas and damage to irrigated cropland will occur from inundation by undefined flow from these canyons. However, since the consensus of the Directors of the Lompoc Soil Conservation District is that the relatively costly channel across the flats should not be installed at this time, it is felt that the construction of this channel should be held in abeyance until after the upstream practices and measures are effectuated, which will allow the design to take advantage of improved watershed conditions and lower construction costs.

Maintenance: No maintenance costs have been figured for farmland and range land measures recommended since it is assumed that such work will be absorbed in the normal farm operation. Annual maintenance on terrace type diversion ditches amounts to \$226, which is based on a cost of one-third cent per foot. Annual maintenance for channel work amounts to \$2600. This is based on two cents per foot for channel maintenance of the main channels in which control measures have been or will be installed, one percent of initial cost for earth-fill dams and head chutes and two percent for maintenance of pipe and wire revetment and stabilizers. In addition to these maintenance costs, an annual replacement cost for pipe and wire construction of \$1540 is estimated. This is estimated on a useful life of approximately 15 years for this type of construction.

Woody plantings will be made back of the pipe and wire which will, it is expected, partly take the place of the pipe and wire by the time renewal is needed. This procedure will not materially change the over-all maintenance cost, but will distribute it more uniformly through the years.

The low dams would cost approximately 2/3 that of the high dams and would stabilize the channel bottom but would be of no value in preventing side cutting and only slightly reduce the quantity of silt produced. The low dams would provide no appreciable debris storage.

The high dams would provide silt storage for a number of years and raise the channel level through much of the gully area to a point where side stabilization by vegetation will be possible. Through side stabilization and debris storage much of the silt problem in this area can be solved.

Lower Gadsden Watershed: The deposition areas included in Field No. 1 (Plate III) include both the Gadsden and Putnam deposition cones. Both the Gadsden and Putnam Channels become shallow and incandescent shortly after they cross under the Camp Cooke-Bullington Highway. Flood flows from both canyons spread out over this field as they pass on to the river depositing most of their silt load and inundating irrigated cropland. Preliminary engineering investigation was made for improved channels to the Santa Ynez River from the canyon mouths handling the flows separately and combined.

It is proposed that structural measures for both watersheds be installed which, in conjunction with the cropping practices and range treatment recommended, will eliminate an estimated 80 percent of the debris that is presently being deposited on the bottomland. (See attached supplement on deposition). It is recognized that the debris free water flowing over these silt cones will tend to spread presently deposited silt over additional areas and damage to irrigated cropland will occur from inundation by undefined flow from these canyons. However, since the consensus of the Director of the Lompoc Soil Conservation District is that the relatively costly channel across the flats should not be installed at this time, it is felt that the construction of this channel should be held in abeyance until after the upstream practices and measures are effectuated, which will allow the design to take advantage of improved watershed conditions and lower construction costs.

Maintenance: No maintenance costs have been figured for farmland and range land measures recommended since it is assumed that such work will be absorbed in the normal farm operation. Annual maintenance on terrace type diversion ditches amounts to \$235, which is based on a cost of one-third cent per foot. Annual maintenance for channel work amounts to \$2500. This is based on two cents per foot for channel maintenance of the main channels in which control measures have been or will be installed, one percent of initial cost for earth-fill dams and head chutes and two percent for maintenance of pipe and wire revetment and stabilizers. In addition to these maintenance costs, an annual replacement cost for pipe and wire construction of \$1540 is estimated. This is estimated on a useful life of approximately 15 years for this type of construction.

Woody plantings will be made back of the pipe and wire which will, it is expected, partly take the place of the pipe and wire by the time renewal is needed. This procedure will not materially change the over-all maintenance cost, but will distribute it more uniformly through the years.

It is expected that all structures within the rights-of-way will be maintained by the maintenance district which will be organized for this purpose. This centralization of maintenance responsibility will eliminate the hazards of individual-farmer maintenance which, experience in this area, has proven to be quite unsatisfactory where structure and channel maintenance are involved.

Right-of-way: Rights-of-way will be required along the main channels of all three watersheds to maintain channels and structural measures to be installed. Since each landowner benefits directly from the channel improvements recommended, it is anticipated that all rights-of-way will be granted as a part of the farmer contribution to the program. Consequently no costs have been estimated for this item.

Proposed method of accomplishing the work: The farm and range land phases of the program and farm diversion ditches will be accomplished through farmer-district agreements with federal contributions being provided through the Lompoc Soil Conservation District. Gully plantings will be done by day labor supervised and paid by the Soil Conservation Service. All construction which can be advertised in large enough units to attract contractors will be constructed under contract by the Soil Conservation Service.

It is expected that all structures within the rights-of-way will be maintained by the maintenance district which will be organized for this purpose. This centralization of maintenance responsibility will eliminate the hazards of individual-farmer maintenance which, experience in this area, has proven to be quite unsatisfactory where structure and channel maintenance are involved.

Right-of-way will be required along the main channels of all three waterways to maintain channels and structural measures to be installed. Since each landowner benefits directly from the channel improvements recommended, it is anticipated that all right-of-way will be granted as a part of the former contribution to the program. Consequently no costs have been estimated for this item.

of the program and farm diversion ditches will be accomplished through farmer-district agreements with federal contributions being provided through the Lopez Soil Conservation District. Gully plantings will be done by day labor supervised and paid by the Soil Conservation Service. All construction which can be advertised in large enough units to attract contractors will be constructed under contract by the Soil Conservation Service.

T A B L E S

	<u>Table No.</u>
Cost Distribution Cropland Area - - - - -	1
Cost Distribution Range Land Area - - - - -	2
Structural Measures on Fields - - - - -	3
Proposed Structural Controls - - - - -	4
Proposed Allocation of Program Costs - - - - -	5
Schedule of Program Establishment - - - - -	6

Table No. 1

COST DISTRIBUTION CROPLAND AREA

Field Numbers	Acreage		Materials			Cost Distribution		
	Irrigated	Dry-land	Seed bed Preparation	Seed	Mulching Fertilizer	Fencing @ \$1.00 per yd.	Farm Owner	Flood Control Total
A7c1	1370		None	None	None	None	None	None
A7a2		411		3452.			3452.	3452.
A7b3, 6 and 14		411		3704.			3704.	3704.
A7c6		33		277.			277.	277.
A7b10, 17, 23, 26 and 34		35		294.			294.	294.
A7c3		41		344.			344.	344.
A7a3, 9, 13, 14 and 15		83	166.	697.			166.	697. 863.
A7b36		24	48.	201.			48.	201. 249.
A7c4, 5, and 7		118	236.	991.			236.	991. 1227.
A7a5, 10 and 11		65	120.	286.				406. 406.
A7a2, 7, 8, 11, 18, 20, 22, 24, 28, 29 & 31		120	240.	528.				768. 768.
A7c8, 12 and 13		75	150.	330.				480. 480.
A7b15, 25 and 27		40	400.	336.	2400.	750.		3886. 3886.
TOTALS	1370	1486	1360.	11440.	2400.	750.	8521.	7429. 15950.

[illegible]

Table No. 2

COST DISTRIBUTION RANGELAND AREA

Field	Unit Description	Units Needed	Unit Cost	Total Cost	Cost Distribution	
					Farm Owner : Flood Control	
A7a12						
Pipe	Feet	1200	\$ 0.25	\$300.00		\$300.00
Water troughs	Each	2	40.00	80.00		80.00
A7b13.						
Fencing	Rods	20	1.00	20.00		20.00
A7b33						
Fencing	Rods	600	1.00	600.00		600.00
					TOTAL	\$1,000.00

Table No. 2

COST DISTRIBUTION HANOVERLAND AREA

Field	Description	Units Needed	Unit Cost	Total Cost	Cost Distribution Farm Owner : Flood Control
AP12	Pipe Water troughs	1200 2	\$ 0.25 40.00	\$300.00 80.00	\$300.00 80.00
AP13	Fencing	20	1.00	20.00	20.00
AP33	Fencing	600	1.00	600.00	600.00
	TOTAL			\$1,000.00	\$1,000.00

Table No. 3

STRUCTURAL MEASURES ON FIELDS

<u>Field No.</u>	<u>Item</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total Initial Cost</u>
A7a2	Diversiion Ditches	31,050 ft.	.07	2174.00
	Outlet Structures	17 ea.	60.00	1020.00
	Outlet Structures	6 ea.	90.00	540.00
	Outlet Structures	4 ea.	125.00	500.00
	Outlet Structures	2 ea.	195.00	390.00
A7b3	Diversiion Ditches	3,260 ft.	.07	229.00
	Outlet Structures	2 ea.	90.00	180.00
A7b6	Diversiion Ditches	14,670 ft.	.07	1,027.00
	Outlet Structures	15 ea.	60.00	900.00
A7b14	Diversiion Ditches	15,820 ft.	.07	1,108.00
	Outlet Structures	8 ea.	60.00	480.00
	Outlet Structures	10 ea.	90.00	900.00
	Outlet Structures	3 ea.	125.00	375.00
	Outlet Structures	2 ea.	195.00	390.00
A7c6	Diversiion Ditches	3,000 ft.	.07	210.00
	Outlet Structures	6 ea.	90.00	540.00
Total - - - - -				\$10,963.00
Contingency - - - - -				<u>1,647.00</u>
Total Estimated Construction Cost -				\$12,610.00

Notes:

Basis of Federal contribution is Federal cost for all structures and half of diversion ditches. Contingency is shown as Federal cost.

Table No. 3

STRUCTURAL MEASURES ON FIELDS

Field No.	Item	Quantity	Unit Cost	Total Initial Cost
4702	Diversion Ditches	31,050 ft.	.07	2174.00
	Outlet Structures	17 ea.	60.00	1020.00
	Outlet Structures	6 ea.	30.00	180.00
	Outlet Structures	4 ea.	125.00	500.00
	Outlet Structures	2 ea.	125.00	250.00
4703	Diversion Ditches	3,560 ft.	.07	249.20
	Outlet Structures	2 ea.	30.00	60.00
4704	Diversion Ditches	14,670 ft.	.07	1026.90
	Outlet Structures	12 ea.	60.00	720.00
4705	Diversion Ditches	12,820 ft.	.07	897.40
	Outlet Structures	8 ea.	60.00	480.00
	Outlet Structures	10 ea.	30.00	300.00
	Outlet Structures	5 ea.	125.00	625.00
	Outlet Structures	2 ea.	125.00	250.00
4706	Diversion Ditches	2,000 ft.	.07	140.00
	Outlet Structures	6 ea.	30.00	180.00
Total -				510,963.00
Contingency -				1,617.00
Total Estimated Construction Cost -				512,580.00

Notes:
 1. Basis of Federal contribution is Federal cost for all structures and half of
 diversion ditches. Contingency is shown as Federal cost.

Table No. 4

PROPOSED STRUCTURAL CONTROLS

Channel or Structure Designation	Description	Items	Units	Unit Cost	Total Initial Cost	Initial Cost per Structure
A7a2-1 2-2 2-3	Clean main channel reaches through Field 2. Replant banks.	Clean	24,500 ft.	0.40	3675.00	9800.00
A7a2-1.1	2 Reinforced Concrete	Excavation	114 c.y.	1.50	171.00	
A7a2-1.2	Drop Structures	Backfill	116 c.y.	1.50	174.00	
		Concrete	36 c.y.	60.00	2160.00	
		Vegetate Backfill	2 structures	20.00	40.00	2545.00
A7a2-1 2-2 2-3	Reinforce existing drop structures	P & W Revetment	23 each	120.00	2760.00	
		Plantings	23 units	10.00	230.00	2990.00
A7b3-1	Plant channel banks and flow line.	Channel planting	7.0 acres	200.00	1400.00	1400.00
A7b3-1.1	Earth Fill Dam with drop inlet spillway	Stripping	1,400 c.y.	.20	280.00	
		Foundation Excavation	3,000 c.y.	1.00	3000.00	
		Structural Excavation	530 c.y.	1.50	800.00	
		Structural Backfill	1,600 c.y.	1.50	2400.00	
		Embankment	16,400 c.y.	.30	4920.00	
		Concrete	363 c.y.	60.00	21780.00	
		Vegetate Dam	1 acre	300.00	300.00	
		Vegetate Borrow Area	1 acre	100.00	100.00	33580.00
A7b3-1.2	Earth Fill Dam with Drop Inlet Spillway	Stripping	1,450 c.y.	.20	290.00	
		Foundation Excavation	2,750 c.y.	1.00	2750.00	
		Structural Excavation	585 c.y.	1.50	880.00	
		Structural Backfill	1,760 c.y.	1.50	2640.00	
		Embankment	14,750 c.y.	.30	4430.00	
		Concrete	393 c.y.	60.00	23580.00	
		Vegetate Dam	1 acre	300.00	300.00	
		Vegetate Borrow Area	1 acre	100.00	100.00	34970.00
	Temporary P & W Checks	Between 1.1 and 1.2	2 each	1500.00	3000.00	3000.00
A7b14-1	Reinforce Existing Drop Structures	P & W Revetment	3 each	120.00	360.00	
		Plantings	3 units	10.00	30.00	390.00
A7b6-1.1	Concrete Head Control Chute.	Remove Existing Structure	Job	200.00	200.00	
		Excavation	5,000 c.y.	.20	1000.00	
		Structural Excavation	278 c.y.	1.50	420.00	
		Structural Backfill	144 c.y.	1.50	220.00	
		Concrete	55 c.y.	60.00	3300.00	
		Diversions Dykes	600 ft.	.10	60.00	
		Vegetate Banks	.5 acre	300.00	150.00	5350.00
A7b14-1.1	Concrete Head Control Chute.	Remove Existing Structure	270 sq.yds.	1.50	405.00	
		Channel Excavation	800 c.y.	.25	200.00	
		Structural Excavation	420 c.y.	1.50	630.00	
		Structural Backfill	280 c.y.	1.50	420.00	
		Embankment	840 c.y.	.30	260.00	
		Concrete	116 c.y.	60.00	6960.00	
		Vegetate Banks	.5 acre	300.00	150.00	9025.00
A7c1-4		Channel planting	3 acres	300.00	900.00	900.00
Total					103,950.00	
Contingency					15,590.00	
Initial Construction Cost					119,540.00	
Engineering					11,960.00	
Total Estimated Cost					\$131,500.00	

Channel or Structure Designation	Description	Items	Units	Quantity	Unit Price	Total	Engineering	Initial	Final
A7a2-1	Clean main channel reaches through field	Channel Blasting	24,500	3.00	73,500.00	73,500.00			
2-2	2. Replant banks.	Asbestos Banks	300	1.20	360.00	360.00			
2-3		Concrete	90	1.00	90.00	90.00			
		Embankment	30	1.50	45.00	45.00			
A7a2-1.1	2 Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.2	Concrete Pipes	2.50	1.50	3.75	5.62	5.62			
A7a2-1.3	Concrete Key	2.50	1.50	3.75	5.62	5.62			
A7a2-1.4	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.5	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.6	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.7	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.8	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.9	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.10	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.11	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.12	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.13	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.14	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.15	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.16	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.17	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.18	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.19	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.20	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.21	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.22	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.23	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.24	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.25	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.26	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.27	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.28	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.29	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.30	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.31	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.32	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.33	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.34	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.35	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.36	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.37	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			
A7a2-1.38	Reinforced Concrete	2.50	1.50	3.75	5.62	5.62			

Table No. 5

Proposed Allocation of Program Costs

Type of Work	Federal Flood Control Funds	Farm Owners	Totals
Agricultural Land Program			
1. Farm Land Treatment	7429.00	8521.00	15,950.00
2. Range Land Treatment	1000.00		1,000.00
3. Structural Treatment	10,238.00	2372.00	12,610.00
4. Technical Assistance	3,000.00		3,000.00
Main Channels			
1. Construction	119,540.00		119,540.00
2. Rights-of-way		By Grants	
3. Engineering	<u>11,960.00</u>		<u>11,960.00</u>
Totals	\$153,167.00	\$10,893.00	\$164,060.00

Table No. 2
Proposed Allocation of Program Costs

Agricultural Land Program			
Type of Work	Federal Flood Control Funds	Farm Owners	Totals
1. Farm Land Treatment	1,250.00	8,521.00	15,350.00
2. Range Land Treatment	1,000.00		1,000.00
3. Structural Treatment	10,238.00	2,375.00	12,613.00
4. Technical Assistance	2,000.00		2,000.00
Main Channels			
1. Construction	113,516.00		113,516.00
2. Right-of-way		By Grants	
3. Engineering	11,900.00		11,900.00
Totals	127,107.00	110,896.00	238,003.00

TABLE NO. 6.

Sub-watershed	Type of Work	Total Cost	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	Subwatershed Totals
A7a - Purisima													
A7a 12	Range treatment	380	190	190									
A7a 3, 9, 13, 14, 15, 5, 10, 11	Farmland treatment	1103	300	803									
A7a, 2-1, 2-2, 2-3	Vegetative plantings	9800	6000	2000	1800								
A7a 2-1, 2-2, 2-3	Repairs to existing structures	2990	2990										
A7a 2-1.1 a2-1.2	Construction 2 gully structures	2545	2545										
A7a2	Diversions and outlets	3537	3537										
A7a	Technical supervision	1500	1000	300	200								
A7a	Contingencies	2858	2243	415	200								24,713
A7b Gebada and E. Gebada B13. 33													
Remainder of Table No. 1	Rangeland & treatment	620	310	310									
A7b 3-1.1	Farmland treatment	6326	1470	4000	856								
A7b 3-1.2	Dams in Main Channel	68550				68550							
	Chutes in Main Channel	14375				14375							
A7b3-1 A7c 1-4	Pipe and Wire Temp. Checks	3000					3000						
A7b14-1	Vegetative plantings	2300	300	400	200	800	300	300					
A7b-3, b-6, b-14 and c6	Repair Existing Structure	390	390										
A7b and A7c	Diversions and outlets	5054	2527	2000	527								
" "	Technical supervision	1500	600	700	100	50	50						
" "	Contingencies	14379	800	1000	200	11929	450						
A7c 1-2 c1-3	Construction engineering	11960	380	250	80	10850	400						128,454
A7b Lower Gebada	Channel protection	31337			31337								31,337
	Channel excavation	101475											
	Channel protection	208250											101475
	Contingencies	40275											208250
A3 San Miguelito	Channel improvement	141550				141550							350,000
	Contingencies	21450				21450							
A3 San Pascual & Rodeo	Channel improvement	141800					141800						163,000
	Contingencies	21200					21200						163,000
B1a Santa Rita													
	Channel stabilization	341475					100000	241475					
	Rangeland treatment	4710		2000	2710								
	Farmland treatment	15500		5500	5000		5000						
	Contingencies	54250		1125	1155		5750	46220					415,935 **
B1b Santa Rosa													
	Channel stabilization	521360						300000	221360				
	Rangeland treatment	12450		2450	4000		4000	2000					
	Farmland treatment	4308		1308	1500		1500						
	Contingencies	80700		560	850		840	350	45000	33100			618,818 ***
B1c Palos Blancos													
	Farmland treatment	3565					1565	1000	1000				
	Rangeland treatment	340					240	100					3,905
Total work by fiscal years													
Overhead allowance 15%		1,899,162	25,582	25,311	50,715	269,554	286,095	291,445	346,000	254,460	350,000	Less farmer contribution	\$1,899,162
Work plan preparation		284,874	3,837	3,797	7,607	40,433	42,914	43,717	51,900	38,169	52,500	Federal cost	- 15,550
Total flood control operations		46,782 *	21,832 *	7,200	7,250	6,500	2,000	2,000	-	-	-		\$1,883,612
Proposed distribution of existing funds		2,230,818	51,251	36,308	65,572	316,487	331,009	337,162	397,900	292,629	402,500		
Deficiency of authorization		188,000	40,419	36,308	65,572	34,869							
		2,042,818	+ 136,749	+ 100,441	+ 34,869	- 281,618	- 612,627	- 949,789	- 1,347,689	- 1,640,318	- 2,042,818		

* Includes \$10,832 expended to July 1, 1946

** Includes \$8,700 farmer contribution

*** Includes \$6,850 farmer contrib.

SECTION 2

	<u>Page</u>
2. Supporting Information and Data for Work Plan - - - - -	1
(a) Photographs (Figures 1 to 20 inclusive) - - - - -	1
(b) Hydrology - - - - -	11
(c) Erosion - - - - -	13

SECTION 2

- 1 Supporting Information and Data for Work Plan
- 1 (a) Photographs (Figures 1 to 20 inclusive)
- 11 (b) Hydrology
- 13 (c) Erosion

			128,454
			31,337
	101,175		
	208,232		350,000
	402,75		
			163,000
			163,000
			415,935 **

00000	221360		
45000	33100		618,818 ***

Total w overhead 1000				1,905
Work pl			Less farmer	\$1,899,162
Total fl			contribution	- 15,550
proposed 6,000	254,460	350,000	Federal cost	\$1,883,612
deficient 1,900	38,169	52,500		
	-	-		
	7,900	292,629	402,500	
Included	7,689	-1,640,318	- 2,042,818	
Included				

SUPPORTING INFORMATION

AREA A7 Work Plan

Photographs (Figures 1 to 20, incl.) - - - - -	1
Hydrology - - - - -	11
Erosion and Sedimentation - - - - -	13

SECTION 2

SUPPORTING INFORMATION

AREA A7 Work Plan

- 1 Photographs (Figures 1 to 20, incl.)
- 11 Hydrology
- 13 Breason and Sedimentation



Figure 1

A panorama view of Four Corners deposition area.
Purisima deposition (light area) in right foreground.
Cebada and East Cebada deposition in center background.



Figure 2

Typical irrigated bottom land used for the production
of flower seed, vegetables, sugar beets and alfalfa.

Figure 1
A panoramic view of Four Corners deposition area.
Purina deposition (light area) in right foreground.
Cobada and East Cobada deposition in center background.

Figure 2
Typical irrigated bottom land used for the production
of flower seed, vegetables, sugar beets and alfalfa.



Figure 3
Typical canyon bottom dry-farmed land cut by deep barranca.
Recommend: Improved crop rotations, crop residue utilization, diversion terraces and special tillage practices.



Figure 4
Dry-farmed hillside cropland. Lima beans in foreground and grain in background.
Recommend: Change in land use to perennial hay or pasture.

Figure 3
Typical bottom bottom dry-farmed land out by deep barrow.
Recommend: Improved crop rotations, crop residue utili-
zation, diversion terraces and special tillage practices.

Figure 4
Dry-farmed hillside cropland. Lima beans in foreground
and grain in background.
Recommend: Change in land use to perennial hay or pasture.



Figure 5

Brush covered hills typical of the upper watershed area. Notice bare raw spots testifying to the instability of the soil.



Figure 6

Annual-type rangeland in upper watershed.

403-11

Figure 8
Brush covered hills typical of the upper watershed area.
Notice bare raw spots testifying to the instability of
the soil.

354-7

Figure 8
Annual-type rangeland in upper watershed.
Notice bare raw spots testifying to the instability of
the soil.



Figure 7

Sheet erosion on winter fallowed hillside lands being prepared for planting beans.

Recommend: Change in land use to perennial hay or pasture.



Figure 8

Steep, severely eroded land in background which was once cultivated, but has now been abandoned. Note deposition of sand (light area) at toe of slope.

Recommend: Fencing, mulching and seeding for conversion to non-use.

324-P

Figure 7
Sheet erosion on winter fallowed hillside lands being prepared for planting beans.
Recommend: Change in land use to perennial hay or pasture.

403-P

Figure 8
Steep, severely eroded land in backcountry which was once cultivated, but has now been abandoned. Note deposition of sand (light area) at toe of slope.

Recommend: Fencing, mulching and seeding for conversion to non-use.



Figure 9
Steep hill lands showing burned over brush lands.
Recommend: Discontinue burning.



Figure 10
Cebada canyon barranca showing head and side cutting
into canyon bottom bean land.

7-514

Figure 9
Steep hill lands showing burned over brush lands.
Recommend: Discontinue burning.

7-514

Figure 10
Geba canyon barriers showing head and side cutting
into canyon bottom bean land.



Figure 11
Four Corners area showing deposition of infertile sand.



Figure 12
Typical sandy, infertile hillside cropland. Note sparse vegetative cover.
Recommend: Planting of cover crop for watershed protection and conversion to non-use.

478-3

Figure 11
Fort Corners area showing deposition of infertile sand.

12

410-4

Figure 12
Typical sandy, infertile hillside cropland. Note sparse
vegetative cover.
Recommend: Planting of cover crop for watershed protection
and conversion to non-use.



Figure 13

Failure of concrete check dam in Purisima Canyon. Dam failure was caused by failure of terrace outlet structure. Grade recession along terrace can be seen in left center. Proper maintenance of terrace outlet would have avoided this failure.



Figure 14

Concrete check dam choked with vegetation. Capacity of structure is materially reduced. Periodic maintenance is necessary to avoid failure.

416-12

Figure 13

Failure of concrete check dam in Hurricane Canyon. Dam failure was caused by failure of terrace outlet structure. Grade recession along terrace can be seen in left center. Proper maintenance of terrace outlet would have avoided this failure.

429-2

Figure 14

Concrete check dam choked with vegetation. Capacity of structure is materially reduced. Periodic maintenance is necessary to avoid failure.



Figure 15
Head control structures in
Cebada Canyon. Recommended
for replacement with structure
No. A7b6-1.1. (See Plate II).

Figure 16
Head control structure in
Cebada Canyon at head of
deep barranca section.
Structure recommended to
be replaced with structure
No. A7b14-1.1. (See Plate II).



Figure 18

Head control structure in
Cabrera Canyon. Recommended
for replacement with structure
No. AV06-1.1. (See Plate II).

417-7

31

Figure 18

Head control structure in
Cabrera Canyon at head of
deep barrow section.
Structure recommended to
be replaced with structure
No. AV014-1.1. (See Plate II).

428-10

Figure 18

Structure recommended for replacement with structure
No. AV014-1.1. (See Plate II).



Figure 17
Cebada Canyon at upper dam site. Structure
No. A7b3-1.2 recommended at this location.



Figure 18
Typical field gully showing
active head cutting. Pipe
overfall structures are recom-
mended for these locations.

11

428-4

Figure 17
Cebada Canyon at upper dam site. Structure
No. AVB3-1.2 recommended at this location.

Figure 18
Typical field fully showing
active head cutting. Pipe
overall structures are recom-
mended for these locations.

428-5



Figure 19

Unmaintained terrace outlet structure showing need for maintenance to insure adequacy of structure.



Figure 20

East Cebada Channel reach A7cl-2 (See Plate III) being cleaned by owner. Note silted channel in foreground. Channel banks require revetment in this sandy material.

19

1-17-1

Figure 19
 Unmaintained terrace outlet structure showing need for
 maintenance to insure adequacy of structure.

20

Figure 20
 East Sebada Channel reach A-1-2 (See Plate III) being
 cleaned by owner. Note silted channel in foreground.
 Channel banks require revetment in this sandy material.

HYDROLOGY - AREA A7

Reference is made to appendix 8 of the U.S.D.A. Survey Report of the Santa Ynez River which covers their investigation of hydrology for the Santa Ynez River and its tributaries. The only stream gaging station on a small watershed in the lower reaches of the Santa Ynez, is located on Salsipuedes Creek which lies approximately 5 miles south of the southern edge of Area A7. Salsipuedes Creek recorded a peak discharge in March 1941, of 7,300 c.f.s. which the referenced report assigned a frequency of once in 40 years. Perusal of report work sheets fails to bring to light the basis for arriving at this frequency. However, since there are no recording rain gages in this vicinity and since the peak discharge noted above is the only measured runoff available, it is felt that this forms the best available data for computing runoff for Area A7.

The Fuller formula which states that the ratio of discharge of two watersheds varies directly with the .8 power of their area ration was used to arrive at a maximum discharge for the Cebada Watershed. This assumes similar watershed characteristics and also identical storm patterns over both watersheds. Since the Isoyhet map, showing average annual rainfall for this areas, prepared by U.S.E.D. shows the average annual precipitation for the Salsipuedes Area is 23 inches while the average annual rainfall for the Cebada Area is 14 inches. The regional standard runoff estimation curves gives a relationship between annual rainfall and maximum intensities. Using three curves and employing the rational method, the maximum discharge computed by the Fuller relationship was reduced to take into consideration the reduction in annual precipitation and intensities.

The fifty-year frequency discharges arrived at for Cebada are as follows:

A7b3-1.1 = 800 c.f.s.

A7b6-1.1 = 280 c.f.s.

A7b14-1.1 = 720 c.f.s.

From local information it is found that the barranca in Cebada Canyon started in the winter of 1910 from the failure of a water storage dam in the upper canyon and heavy runoff caused by heavy rains that year. A large portion of the barranca was formed that year. In 1916 the County of Santa Barbara constructed a timber chute at the head of the barranca to protect their road which runs adjacent to the barrance at this point. This chute had a capacity of approximately 150 c.f.s. and functioned satisfactorily until 1939 when it was torn out and replaced with a concrete head chute by the Soil Conservation Service-CCC Camp. The concrete chute has a design capacity of 310 c.f.s. The CCC Camp had repaired the timber chute prior to replacing it. Repair work was necessitated by leakage through the chute section which had undermined some of the timber supports which were built up from timber mud sills or plates resting on the barranca bottom. The type of construction was such that any large over-topping of this structure would have probably caused failure of the structure. The original chute would probably have passed about 225 c.f.s. before topping occurred and the present concrete chute will carry approximately 450 c.f.s. before topping occurs,

HYDROLOGY - AREA AV

Reference is made to appendix 8 of the U.S.D.A. Survey Report of the Santa Ynez River which covers their investigation of hydrology for the Santa Ynez River and its tributaries. The only stream gaging station on a small watershed in the lower reaches of the Santa Ynez, is located on Salinas Creek which lies approximately 5 miles south of the southern edge of Area AV. Salinas Creek recorded a peak discharge in March 1941, of 7,300 c.f.s. which the referenced report assigned a frequency of once in 40 years. Personal of report work sheets fails to bring to light the basis for arriving at this frequency. However, since there are no recording rain gages in this vicinity and since the peak discharge noted above is the only measured runoff available, it is felt that this forms the best available data for computing runoff for Area AV.

The Fuller formula which states that the ratio of discharge of two watersheds varies directly with the .8 power of their area ratio was used to arrive at a maximum discharge for the Cebada Watershed. This assumes similar watershed characteristics and also identical storm patterns over both watersheds. Since the Isophet map, showing average annual rainfall for this area, prepared by U.S.D.A. shows the average annual precipitation for the Salinas Area is 28 inches while the average annual rainfall for the Cebada Area is 14 inches. The regional standard runoff estimation curves gives a relationship between annual rainfall and maximum intensities. Using three curves and employing the rational method, the maximum discharge computed by the Fuller relationship was reduced to take into consideration the reduction in annual precipitation and intensities.

The fifty-year frequency discharges arrived at for Cebada are as follows:

AVB2-1.1 = 800 c.f.s.
AVB6-1.1 = 280 c.f.s.
AVB14-1.1 = 720 c.f.s.

From local information it is found that the barranca in Cebada Canyon started in the winter of 1910 from the failure of a water storage dam in the upper canyon and heavy runoff caused by heavy rains that year. A large portion of the barranca was formed that year. In 1916 the County of Santa Barbara constructed a timber chute at the head of the barranca to protect their road which runs adjacent to the barranca at this point. This chute had a capacity of approximately 150 c.f.s. and functioned satisfactorily until 1933 when it was torn out and replaced with a concrete head chute by the Soil Conservation Service-GCC Camp. The concrete chute has a design capacity of 210 c.f.s. The GCC Camp had repaired the timber chute prior to replacing it. Repair work was necessitated by leakage through the chute section which had undermined some of the timber supports which were built up from timber and sills or plates resting on the barranca bottom. The type of construction was such that any large over-topping of this structure would have probably caused failure of the structure. The original chute would probably have passed about 225 c.f.s. before topping occurred and the present concrete chute will carry approximately 450 c.f.s. before topping occurs.

utilizing free board for capacity. There is no evidence or known observation that either of these structures has ever topped. There are two side gully heads located approximately 1/4 mile below the present structure which received runoff from secondary field gullies. These field gullies could conceivably intercept runoff that may have overflowed the main channel above the chute structure due to lack of channel capacity. Each of these uncontrolled heads are approximately 100 feet long which indicates a relatively small quantity of flow has ever reached them since the soils are a deep, fine sand which would probably cause rapid head recession in any long or frequent flow.

The maximum observed discharge of the concrete chute occurred February 11, 1938 when 62.0 c.f.s. was computed to have passed this point. A total of 3.78 inches of rain was recorded in this 24-hour period which caused more runoff in this area than the February 28 to March 2, 1938 storm that did the widespread damage in Southern California. Other heavy storms for this area include: March 3, 1938, - 1.87" of rain with a 5-day storm total of 4.10". January 11, 1940 - 2.10" with an 8-day storm total of 4.21". December 28, 1941 - 5.21" with a 4-day storm total of 6.72". January 22, 1943 - 2.34". January 23, 1943 - 1.60" with a 7-day storm total of 5.70". None of the above recorded storms caused topping of the present head structure as far as can be determined. Since the relatively small head structures have operated successfully and have been adequate for the past 32 years, the estimated maximum peak discharge expected once in 50 years of 720 c.f.s. appears reasonable.

Maximum discharge for the East Cebada Watershed were arrived at using the same relationships employed in computing runoff figures for the Cebada Watershed.

Since channel work recommended in the Purisima Watershed consists of replacement of structures between existing structures, the capacities of structures above and below the contemplated construction were used.

EROSION AND SEDIMENTATION

Reference is made to U.S.D.A. Survey Report of the Santa Ynez River appendix 9 which covers their erosion and sedimentation investigation and analysis. Table 6 of reference appendix is reproduced below for watershed areas covered by this report. This table is based on surveys and investigations that were completed in 1941, however, since no material change has been observed in erosion, sedimentation or land use, values contained in the table are considered representative of present conditions.

Quantity of Sediments Eroded, Deposited and Passing to
Santa Ynez River from Farmland Area A-7

Drainage	Sheet Erosion		Gully Erosion		Sedimentation		Loss to S.Y. River	
	Total	Av.An.	Total	Av.An.	Total	Av.An.	Total	Av. An.
	ac.ft.	ac.ft.	Ac.ft.	Ac.ft.	Ac.ft.	Ac.ft.	Ac.ft.	Ac. ft.
Purisima	46.4	1.45	58.3	1.82	)			
Cebada	52.0	1.63	832.0	26.00	1057.)			
East Cebada	42.0	1.31	57.0	1.78	45.-) 34.7		44.5	1.4
Dutra Ranch	23.0	.75	44.0	1.38	17			

For the watershed area under consideration, the table above shows an average annual erosion total of 36.1 acre feet of which 34.7 acre feet are being deposited on the valley bottom lands and 1.4 acre feet are being carried on through to the Santa Ynez River. With the installation of channel controls and improved land use practices as recommended, it is estimated that 80% of the average annual sedimentation will be eliminated.

EROSION AND SEDIMENTATION

Reference is made to U.S.D.A. Survey Report of the Santa Ynez River Appendix 2 which covers their erosion and sedimentation investigation and analysis. Table 6 of reference appendix is reproduced below for watershed areas covered by this report. This table is based on surveys and investigations that were completed. In 1941, however, since no material change has been observed in erosion, sedimentation or land use, values contained in the table are considered representative of present conditions.

Quantity of Sediments Eroded, Deposited and Passing to Santa Ynez River from Watershed Area A-V

Drainage	Sheet Erosion			Gully Erosion			Sedimentation			Loss to S.Y. River		
	Total	Av. An.	Ac. Ft.	Total	Av. An.	Ac. Ft.	Total	Av. An.	Ac. Ft.	Total	Av. An.	Ac. Ft.
Pratins	40.4	1.45	58.3	1.83								
Cebada	82.0	1.83	832.0	28.00			108.7					
East Cebada	42.0	1.31	27.0	1.78			45.7	34.7	44.5			1.4
Dutra Ranch	23.0	.75	44.0	1.38			17					

For the watershed area under consideration, the table above shows an average annual erosion total of 86.1 acre feet of which 34.7 acre feet are being deposited on the valley bottom lands and 1.4 acre feet are being carried on through to the Santa Ynez River. With the installation of channel controls and improved land use practices as recommended, it is estimated that 80% of the average annual sedimentation will be eliminated.

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SECTION 3

RECONNAISSANCE SURVEY REPORT OF SUB-WATERSHED AREAS

A7b, A7c, B1 and A3

In order to estimate approximate costs and cost ration for the establishment of flood control practices in the various sub-watersheds of the Santa Ynez Watershed, which have been approved for planning, a reconnaissance investigation was made of the watershed: East Cebada, Lower Cebada, Santa Rita, Santa Rosa, Palos Blancos, San Miguelito, Rodeo and San Pasqual.

This investigation, together with the conservation survey report for the area, from which we obtained land-use and class, and the preliminary plan for Purisima A7a and Upper Cebada A7b, which are typical of the B1 Area, the following table was developed, showing practice cost distribution by sub-areas.

RECONNAISSANCE SURVEY REPORT OF SUB-WATERSHED AREAS

A7b, A7c, B1 and A3

In order to estimate approximate costs and cost ration for the establishment of flood control practices in the various sub-watersheds of the Santa Ynez Watershed, which have been approved for planning, a reconnaissance investigation was made of the watershed: East Cebada, Lower Cebada, Santa Rita, Santa Rosa, Palos Blancos, San Miguelito, Rodeo and San Pascual.

This investigation, together with the conservation survey report for the area, from which we obtained land-use and class, and the preliminary plan for Furthest A7s and Upper Cebada A7b, which are typical of the B1 Area, the following table was developed, showing practice cost distribution by sub-areas.

San Miguelito Watershed - Area B1
San Rita Watershed - Area B1
San Rosa Watershed - Area B1
Palos Blancos Watershed - Area B1
San Pascual Watershed - Area B1
San Rodeo Watershed - Area B1
San Cebada Watershed - Area B1
San Cebada (Lower) Watershed - Area B1

COST DISTRIBUTION BY AREA AND PRACTICE

Area	Practice	Cost	Cost Distribution		Total Cost
			Owner	Federal	
Santa Rita - Hoag					
Bla1 (1955 acres)	1. Terracing	800	400	400	5100
	2. Terracing outlets	2000		2000	
	3. Seeding	1400	1100	300	
	4. Mulching & Fencing-Seeding	700		700	
	5. Range Practices	200		200	
Bla2 (2640 acres)	1. "	700	350	350	7720
	2. "	1800		1800	
	3. "	4000	1900	2100	
	4. "	1000		1000	
	5. "	220		220	
Bla3 (1285 acres)	1. "	900	450	450	5210
	2. "	2300		2300	
	3. "	1400	1300	100	
	4. "	500		500	
	5. "	110		110	
Bla4 (4730 acres)	1. "	1600	800	800	10880
	2. "	4100		4100	
	3. "	3200	2400	800	
	4. "	1800		1800	
	5. "	180		180	
Drum-Santa Rosa					
B1b1 (1450 acres)	1. "	600	300	300	5320
	2. "	1600		1600	
	3. "	2400	1400	1000	
	4. "	560		560	
	5. "	160		160	
B1b2 (2030 acres)	1. "	500	250	250	5460
	2. "	1300		1300	
	3. "	2700	1100	1600	
	4. "	780		780	
	5. "	180		180	
B1b3 (5035 acres)	1. "	1600	800	800	10480
	2. "	4000		4000	
	3. "	2700	2300	400	
	4. "	2000		2000	
	5. "	180		180	
B1b4 (1120 acres)	1. "	300	150	150	2348
	2. "	750		750	
	3. "	850	550	300	
	4. "	430		430	
	5. "	18		18	
B1c1 (3251 acres)	1. "	540	270	270	3150
	2. "	1400		1400	
	3. "	1000	800	200	
	4. "	210		210	
	5. "				
B1c2 (1085 acres)	1. "	310	155	155	2730
	2. "	790		790	
	3. "	1500	750	750	
	4. "				
	5. "	130		130	
Total Cost			\$17525.	\$40,873	\$58,398

COST DISTRIBUTION BY AREA AND PRACTICE

RECOMMENDED HARVEST WEIGHT OF SUB-IRRIGATED AREAS

Area	Practice	Cost	Cost Distribution		Total Cost
			Owner	Federal	
Santa Rita - Hosa Blas (1955 acres)	1. Terracing	800	1400	1400	5100
	2. Terracing outlets	2000		2000	
	3. Seeding	1100	1100	300	
	4. Mulching & Fertilizing-Seeding	700		700	
	5. Range Practices	200		200	
Blas (2040 acres)	1. "	700	350	350	1750
	2. "	1800		1800	
	3. "	4000	1900	2100	
	4. "	1000		1000	
	5. "	250		250	
Blas (1285 acres)	1. "	900	450	1450	2510
	2. "	2300		2300	
	3. "	1400	1300	100	
	4. "	500		500	
	5. "	110		110	
Blas (1430 acres)	1. "	1600	800	800	10680
	2. "	1100		1100	
	3. "	3200	2400	800	
	4. "	1800		1800	
	5. "	180		180	
Blas (1450 acres)	1. "	600	300	300	2350
	2. "	1600		1600	
	3. "	2400	1400	1000	
	4. "	560		560	
	5. "	160		160	
Blas (2030 acres)	1. "	500	250	250	2450
	2. "	1300		1300	
	3. "	2700	1100	1600	
	4. "	780		780	
	5. "	180		180	
Blas (2035 acres)	1. "	1900	800	800	10480
	2. "	4000		4000	
	3. "	2700	2300	400	
	4. "	2000		2000	
	5. "	180		180	
Blas (1150 acres)	1. "	300	150	150	2348
	2. "	750		750	
	3. "	850	250	300	
	4. "	130		130	
	5. "	18		18	
Blas (3251 acres)	1. "	440	220	220	3150
	2. "	1400		1400	
	3. "	1000	800	200	
	4. "	210		210	
	5. "				
Blas (1085 acres)	1. "	310	155	155	2150
	2. "	750		750	
	3. "	1200	750	750	
	4. "				
	5. "	130		130	
Total Cost					
11725. 28,398					

Runoff disposal system

Reference is made to USDA Survey Report of the Santa Ynez River with particular reference to type of runoff disposal controls originally contemplated and estimated costs.

Santa Rita Watershed - Area Bla: For purposes of this reconnaissance survey the Santa Rita Watershed has been subdivided as follows: Lower Santa Rita (Area Bla1) which includes the watershed from the river to the convergence of the 3 main forks, Hoag (Area (Bla2) which is the left hand fork, West Fork Santa Rita (Area (Bla3) which is the center fork, and East Fork Santa Rita (Area Bla4) which is the right hand fork of the upper watershed.

The main channels of the 3 upper sub-watersheds are well defined and for the most part deeply entrenched downstream to where they converge to form the main channel to the river (Area Bla1). Along the main channel reach, the gully alternately becomes deeply entrenched and then opens out on a deposition area where there is little or no channel definition. Through this main channel reach there are several deposition cones over which storm water spreads out depositing its silt load. These cones terminate near the lower edge in a gully head below which the channel is again deeply entrenched.

Table 39, Appendix 4 of referenced report tabulates quantities and costs for channel controls for this watershed. It is evident from this table that complete control of the main channels was planned to eliminate both the deposition on cropland and cropland lost by gully enlargement. The cost benefit analysis made in reference report indicates that benefits arrived at were based on elimination of these losses.

In making an estimate of cost of gully control for this watershed, existing structures installed by the SCS-CCC Camp have been assumed adequate and included. These structures, located in the lower reaches of the 3 upper sub-watershed (Hoag, East and West Fork Santa Rita), take up a total of 125 feet of lift and have approximately one-quarter the required capacity for runoff expected once in 50 years. However, since they have functioned satisfactorily for the past 8 to 10 years it seems logical to utilize them in any flood control plan for this area. Utilization of these structures will make it necessary to keep structures planned upstream from them of the same capacity or smaller. The main channel below the junction of the 3 upper sub-watersheds has been planned at a capacity estimated to pass floods expected once in 50 years. Runoff estimated has been based on the same assumptions used in computing runoff for the detailed report for Area A-7.

To install the necessary drop structures and head controls and excavate channels through deposition areas for complete gully control through the main channels will require an initial outlay of approximately \$342,000.

As an alternate to complete channel control, a preliminary investigation was made to determine the cost of control of the existing gully heads leaving channel reaches between gully heads uncontrolled. Cost of this type of control

Runoff disposal system

Reference is made to USDA Survey Report of the Santa Ynez River with particular reference to type of runoff disposal controls originally contemplated and estimated costs.

Santa Rita Watershed - Area Blal For purposes of this reconnaissance survey the Santa Rita Watershed has been subdivided as follows: Lower Santa Rita (Area Blal) which includes the watershed from the river to the convergence of the 3 main forks, Hoag (Area Blal2) which is the left hand fork, West Fork Santa Rita (Area Blal3) which is the center fork, and East Fork Santa Rita (Area Blal4) which is the right hand fork of the upper watershed.

The main channels of the 3 upper sub-watersheds are well defined and for the most part deeply entrenched downstream to where they converge to form the main channel to the river (Area Blal). Along the main channel reach, the gully alternately becomes deeply entrenched and then opens out on a deposition area where there is little or no channel definition. Through this main channel reach there are several deposition cones over which storm water spreads out depositing its silt load. These cones terminate near the lower edge in a gully head below which the channel is again deeply entrenched.

Table 39, Appendix 4 of referenced report tabulates quantities and costs for channel controls for this watershed. It is evident from this table that complete control of the main channels was planned to eliminate both the deposition on cropland and cropland lost by gully enlargement. The cost benefit analysis made in reference report indicates that benefits arrived at were based on elimination of these losses.

In making an estimate of cost of gully control for this watershed, existing structures installed by the SCS-CCC Camp have been assumed adequate and included. These structures, located in the lower reaches of the 3 upper sub-watersheds (Hoag, East and West Fork Santa Rita), take up a total of 125 feet of lift and have approximately one-quarter the required capacity for runoff expected once in 50 years. However, since they have functioned satisfactorily for the past 8 to 10 years it seems logical to utilize them in any flood control plan for this area. Utilization of these structures will make it necessary to keep structures planned upstream from them of the same capacity or smaller. The main channel below the junction of the 3 upper sub-watersheds has been planned at a capacity estimated to pass floods expected once in 50 years. Runoff estimated has been based on the same assumptions used in computing runoff for the detailed report for Areas A-7.

To install the necessary drop structures and head controls and excavate channels through deposition areas for complete gully control through the main channels will require an initial outlay of approximately \$342,000.

As an alternate to complete channel control, a preliminary investigation was made to determine the cost of control of the existing gully heads leaving channel reaches between gully heads uncontrolled. Cost of this type of control

is estimated at \$91,000. This type of control would arrest present head recessions but would require relatively high maintenance in the form of additional protection at the lower ends of the structures at such time as future grade recession undercuts them sufficiently to jeopardize their stability. Reference report estimates a total average annual erosion for this watershed of 42 acre feet of which 80% is estimated to be derived from gully erosion (Table 6, Appendix 9). Should head controls be installed without controlling intermediate channel reaches, gully erosion will continue from both vertical and lateral cutting which will produce sufficient debris that successful operation of any excavated channel across the deposition areas would be seriously jeopardized. It would, therefore, be necessary to reassess the benefits derived from this alternate plan to determine its feasibility in the light of the conclusion that such a plan would arrest recession of present gully heads but continued development of both gullies and deposition areas could be expected at a somewhat slower rate.

Santa Rosa Watershed - Area Blb: For purposes of this reconnaissance survey the Santa Rosa Watershed has been divided as follows: Area Blb1 lower watershed between convergence of 3 main forks and the river; Area Blb2 west fork of watershed to the main channel; Area Blb3 Drum Canyon or Middle Fork; Area Blb4 Crawford Canyon or east fork.

The main channels of the Santa Rosa Watershed are still in the initial stage of barranca development. Channel sections are relatively small and regular with no active head recessions in the main flow line. The upper reaches are more active with several channel heads working back through cultivated land.

Table 39, Appendix 4 of referenced report tabulates quantities and costs for channel controls for this watershed. It is evident from this table that complete control of the main channels was planned to eliminate both the deposition on cropland and cropland lost by gully formation and enlargement. The cost benefit analysis made in referenced report indicates that benefits arrived at were based on elimination of these losses. Referenced report bases damage estimates on floods expected once in 50 years; therefore it would appear logical that channel controls would have to be adequate for floods of this magnitude if benefits from elimination of these flood damages are to be credited. Since runoff expected once in 50 years in the main channels of this watershed are slightly larger than the discharge computed for the main channels of the Santa Rita watershed and the total vertical lift to be taken up with drop structures is greater for this watershed, it is evident that complete, adequate channel control will be more costly for this watershed than for Santa Rita. It is estimated at \$521,360.

In lieu of the complete gully control, an alternate has been made consisting of: Installation of head structure in the upper and side gullies to arrest their recession and define the channel flow through the 2 deposition areas in West Fork of Santa Rosa (Area Blb2). The estimated cost of this plan is \$27,000. This plan would control and define the channel through the deposition areas and arrest head cutting of the present channel heads. Barranca development would not be controlled and benefits would have to be reduced in proportion.

is estimated at \$21,000. This type of control would arrest present head recessions but would require relatively high maintenance in the form of additional protection at the lower ends of the structures at such time as future grade recession undercuts them sufficiently to jeopardize their stability. Reference report estimates a total average annual erosion for this watershed of 42 acre feet of which 80% is estimated to be derived from gully erosion (Table 6, Appendix 9). Should head controls be installed without controlling intermediate channel reaches, gully erosion will continue from both vertical and lateral cutting which will produce sufficient debris that successful operation of any excavated channel across the deposition areas would be seriously jeopardized. It would, therefore, be necessary to reassess the benefits derived from this alternate plan to determine its feasibility in the light of the conclusion that such a plan would arrest recession of present gully heads but continued development of both gullies and deposition areas could be expected at a somewhat slower rate.

Santa Rosa Watershed - Area B1b: For purposes of this reconnaissance survey the Santa Rosa Watershed has been divided as follows: Area B1b, lower watershed between convergence of 3 main forks and the river; Area B1b2, west fork of watershed to the main channel; Area B1b3, Drum Canyon or Middle Fork; Area B1b4, Crawford Canyon or east fork.

The main channels of the Santa Rosa Watershed are still in the initial stage of barrence development. Channel sections are relatively small and regular with no active head recessions in the main flow line. The upper reaches are more active with several channel heads working back through cultivated land.

Table 39, Appendix 4 of referenced report tabulates quantities and costs for channel controls for this watershed. It is evident from this table that complete control of the main channels was planned to eliminate both the deposition on cropland and cropland lost by gully formation and enlargement. The cost benefit analysis made in referenced report indicates that benefits arrived at were based on elimination of these losses. Referenced report bases damage estimates on floods expected once in 50 years; therefore it would appear logical that channel controls would have to be adequate for floods of this magnitude if benefits from elimination of these flood damages are to be credited. Since runoff expected once in 50 years in the main channels of this watershed are slightly larger than the discharge computed for the main channels of the Santa Rita watershed and the total vertical lift to be taken up with drop structures is greater for this watershed, it is evident that complete, adequate channel control will be more costly for this watershed than for Santa Rita. It is estimated at \$21,300.

In lieu of the complete gully control, an alternate has been made consisting of: installation of head structure in the upper and side gullies to arrest their recession and define the channel flow through the 2 deposition areas in West Fork of Santa Rosa (Area B1b2). The estimated cost of this plan is \$27,000. This plan would control and define the channel through the deposition areas and arrest head cutting of the present channel heads. Barrence development would not be controlled and benefits would have to be reduced in proportion.

The alternates given for both Santa Rita and Santa Rosa will reduce the rate of deterioration for a short period, but if not followed up with the measures indicated for complete control no permanent good will be accomplished and eventually measures indicated in the alternate plan will be destroyed. The treatment now needed is costly but postponement of treatment will result in even more costly measures if these watersheds are to be saved from complete destruction.

The installation of the alternate would place the responsibility for construction, the need for which is now foreseeable, under the name of maintenance. Such a maintenance load is beyond the ability of the farmers to finance.

Palos Blancos Watershed -- Area B1c: Since no barranca has developed in this watershed the problem is one of proper land use of the tributary area and no channel control is planned.

San Miguelito Channel -- Area A-3: Reference report recommended construction of a flood channel for the outlet of this sub-watershed with no upstream control of the watershed area since such control would not improve runoff conditions sufficiently to warrant the costs. The channel control investigated in this report consists of enlargement of present debris basin in the canyon mouth and excavation of an earth channel to the Santa Ynez River. See Plate II for location and alignment. This plan will require 3 grade control structures located at (a) debris basin, (b) outlet of channel into slough and (c) outlet of slough into the river. Five street crossings, one highway and one railroad crossing will be required and the channel will require lining through the restricted section adjacent to the Lompoc Terrace Housing Project. Right-of-way for the debris basin and channel will have to be purchased since land along proposed channel alignment is some of the best agricultural land in the valley and for considerable length of this alignment there is no particular flood problem at present. The proposed alignment is considered the shortest, most logical route to the river.

At present the excavated channel below the debris basin runs along property lines breaking alignment sharply at property corners and finally discharges into the San Miguelito slough. Length of this channel is approximately 3 miles and has a capacity decreasing from 20% to 10% of design capacity required. Discharge of this channel follows the slough for approximately 3 miles at the end of which it flows out across cultivated land. Below this point the flow becomes so poorly defined it is difficult to determine its general course. There is no definite flow pattern to the river. Since proposed channel length is approximately 7600' and disposes flood flows in the river, it is felt that realignment is justified.

Total estimated cost of construction of this channel with appurtenances described above is \$163,000 including 23 acres of rights-of-way.

While the estimated cost is high, no decrease in capacity appears warranted since present damage is caused from water inundation and not sedimentation.

The alternatives given for both Santa Rita and Santa Rosa will reduce the rate of deterioration for a short period, but if not followed up with the measures indicated for complete control no permanent good will be accomplished and eventually measures indicated in the alternative plan will be destroyed. The treatment now needed is costly but postponement of treatment will result in even more costly measures if these watersheds are to be saved from complete destruction.

The installation of the alternative would place the responsibility for construction, the need for which is now foreseeable, under the name of maintenance. Such a maintenance load is beyond the ability of the farmers to finance.

Palca Blanco Watershed -- Area B-1: Since no drainage has developed in this watershed the problem is one of proper land use of the tributary area and no channel control is planned.

San Miguelito Channel -- Area A-3: Reference report recommended construction of a flood channel for the outlet of this sub-watershed with no upstream control of the watershed area since such control would not improve runoff conditions sufficiently to warrant the costs. The channel control investigated in this report consists of enlargement of present debris basin in the canyon mouth and excavation of an earth channel to the Santa Ynez River. See Plate II for location and alignment. This plan will require 3 grade control structures located at (a) debris basin, (b) outlet of channel into slough and (c) outlet of slough into the river. Five street crossings, one highway and one railroad crossing will be required and the channel will require lining through the restricted section adjacent to the Lopez Terrace Housing Project. Right-of-way for the debris basin and channel will have to be purchased since land along proposed channel alignment is some of the best agricultural land in the valley and for considerable length of this alignment there is no particular flood problem at present. The proposed alignment is considered the shortest, most logical route to the river.

At present the excavated channel below the debris basin runs along property lines breaking alignment sharply at property corners and finally discharges into the San Miguelito slough. Length of this channel is approximately 3 miles and has a capacity decreasing from 20% to 10% of design capacity required. Discharge of this channel follows the slough for approximately 3 miles at the end of which it flows out across cultivated land. Below this point the flow becomes so poorly defined it is difficult to determine its general course. There is no definite flow pattern to the river. Since proposed channel length is approximately 700' and disposes flood flows in the river, it is felt that realignment is justified.

Total estimated cost of construction of this channel with appurtenances described above is \$163,000 including 23 acres of right-of-way.

While the estimated cost is high, no decrease in capacity appears warranted since present damage is caused from water inundation and not sedimentation.

San Pasqual and Rodeo Channels - Area A-3: Preliminary surveys indicate that combining the flows of San Pasqual and Rodeo canyons is practicable and more economical than controlling them separately. Since the combined flows of these two channels is approximately the same as the discharge of San Miguelito and costs of appurtenances and rights-of-way essentially the same no separate estimate has been made for this channel work. Projection of costs from San Miguelito indicate that the estimated cost of channel work for the combined flow of San Pasqual and Rodeo Canyons will be within 10% of the cost of San Miguelito construction, or \$163,000. Plate II shows present and proposed alignment for this channel.

East Cebada Watershed - A7c

At the time of the Flood Control Survey an appreciable part of this watershed was under cultivation to beans, mustard and cereal hay crops. At present only a very minor portion of the sub-watershed is cultivated, and the major portion is devoted to hay and pasture.

This has resulted in a material reduction of sediment and the remaining problem is almost entirely one of channel definition and protection. The proposed treatment of this channel was considered first (as shown in the survey report) in combination with the lower Cebada and Purisima in (a) concrete lined channel, (b) an earth channel with pipe and wire revetment and (c) an unprotected earth channel and secondly as following its present alignment separately with pipe and wire protection with bottom stabilizers.

The investigations determined that the only part of this channel contributing to flood and debris problems is confined to a section of approximately 3000 feet immediately upstream from the Lompoc-Purisima highway where side caving of banks tends to fill the channel and cause annual flooding of adjacent fields. The proposed treatment of this problem is to revet both sides of the channel with pipe and wire and plant to arborescent vegetation along and back of the pipe and wire which will provide side protection when the pipe and wire deteriorates. Bottom stabilization will be accomplished by concrete or pipe and wire collars.

This type of protection will cost approximately \$31,350 as compared to \$37,500 for constructing a new channel to combine East Cebada with Lower Cebada Channel.

The plantings in the upper reach of East Cebada is planned to reduce the rate of movement of channel debris in the area which has been converted from crop land to pasture.

Lower Cebada (Cebada #2) A7b

This sub area as considered here includes that section of Cebada drainage

San Pascual and Roboe Channels - Area A-3: Preliminary surveys indicate that combining the flows of San Pascual and Roboe canyons is practicable and more economical than controlling them separately. Since the combined flows of these two channels is approximately the same as the discharge of San Miguelito and costs of appurtenances and right-of-way essentially the same no separate estimate has been made for this channel work. Protection of costs from San Miguelito indicate that the estimated cost of channel work for the combined flow of San Pascual and Roboe Canyons will be within 10% of the cost of San Miguelito construction, or \$163,000. Plate II shows present and proposed alignment for this channel.

East Cebada Watershed - A7c

At the time of the Flood Control Survey an appreciable part of this watershed was under cultivation to beans, mustard and cereal hay crops. At present only a very minor portion of the sub-watershed is cultivated, and the major portion is devoted to hay and pasture.

This has resulted in a material reduction of sediment and the remaining problem is almost entirely one of channel definition and protection. The proposed treatment of this channel was considered first (as shown in the survey report) in combination with the lower Cebada and Purisima in (a) concrete lined channel, (b) an earth channel with pipe and wire revetment and (c) an unprotected earth channel and secondly as following its present alignment separately with pipe and wire protection with bottom stabilizers.

The investigations determined that the only part of this channel contributing to flood and debris problems is confined to a section of approximately 3000 feet immediately upstream from the Lopez-Purisima highway where side caving of banks tends to fill the channel and cause annual flooding of adjacent fields. The proposed treatment of this problem is to revet both sides of the channel with pipe and wire and plant to arborescent vegetation along and back of the pipe and wire which will provide side protection when the pipe and wire deteriorates. Bottom stabilization will be accomplished by concrete or pipe and wire collars.

This type of protection will cost approximately \$31,350 as compared to \$37,500 for constructing a new channel to combine East Cebada with lower Cebada Channel.

The plantings in the upper reach of East Cebada is planned to reduce the rate of movement of channel debris in the area which has been converted from crop land to pasture.

Lower Cebada (Cebada #2) A7b

This sub area as considered here includes that section of Cebada drainage

from the mouth of the canyon to the Santa Ynez River and that part of the Purisima Channel below the Camp Cook Highway.

They were considered as a unit for two reasons:

1. Independent channelization of Purisima to the river could not be justified on a cost-benefit ratio.
2. Overflow of Purisima channel would endanger any channelization attempted for Cebada.

The increased cost of channelization of Cebada due to the Purisima inclusion can be justified by benefits to the area now subject to flooding from Purisima.

The methods of control considered for this area include:

1. Handling each channel separately with, (a) unprotected earth channels, (b) earth channels with pipe and wire side and bottom protection and (c) concrete lining.
2. Combining the three channels at or above the "Four Corners" with the same three types of protection.
3. Combining Cebada and East Cebada at the canyon mouth and outlet by enlarging the present East Cebada Channel to the river and also by using the present Cebada Channel and construction of a new channel from the end of the present channel to the river. The three types of protection were considered.
4. Combining Cebada and Purisima just below the "Four Corners" in a new channel to the river using, (a) unprotected earth channel, (b) pipe and wire protection and (c) concrete lining.
5. Using 88 acres of farm land just above the Four Corners as a debris basin and combining East Cebada and Cebada from the debris basin to the river.

In analyzing these possibilities it was initially determined that approximately 75% of the proposed alignment is in an area where the entire channel section would be through very fine sand which is unstable when saturated. Past experience has proven that side slopes cannot be maintained without protection.

Silt cannot be completely eliminated from flow in these channels though it will be materially reduced. Channel shape cannot be controlled to maintain adequate velocity under varied flow. From these facts it is evident that in low flows an earth channel would act as a silt storage area and in order to maintain an adequate channel section for flood flows it would be necessary to remove the silt accumulation after each storm. The cost of this silt removal would be a maintenance cost above the ability of local farmers to finance. For these reasons the idea of unprotected channels was discarded as not being an effective solution within the financial ability of farmers to maintain.

from the mouth of the canyon to the Santa Ynez River and that part of the Purisima Channel below the Camp Cook Highway. Since the combined flow of the two channels is considerable, they were considered as a unit for two reasons: (1) the character of the channel and (2) the cost of improvement and right-of-way essentially the same. Independent channelization of Purisima to the river could not be justified on a cost-benefit ratio. The cost of channel work for the combined flow of San Pedro and Nader Canyons will be within 10% of the cost of San Pedro Canyon. Overflow of Purisima channel would endanger any channelization attempted for Cebada.

The increased cost of channelization of Cebada due to the Purisima inclusion can be justified by benefits to the area now subject to flooding from Purisima. The methods of control considered for this area include:

- (a) Handling each channel separately with (1) unprotected earth channels, (2) earth channels with pipe and wire side and bottom protection and (3) concrete lining.

2. Combining the three channels at or above the "Four Corners" with the same three types of protection.

3. Combining Cebada and East Cebada at the canyon mouth and outlet by enlarging the present East Cebada Channel to the river and also by using the present Cebada Channel and construction of a new channel from the end of the present channel to the river. The three types of protection were considered.

4. Combining Cebada and Purisima just below the "Four Corners" in a new channel to the river using (1) unprotected earth channel, (2) pipe and wire protection and (3) concrete lining.

5. Using 88 acres of farm land just above the Four Corners as a debris basin and combining East Cebada and Cebada from the debris basin to the river.

In analyzing these possibilities it was initially determined that approximately 75% of the proposed alignment is in an area where the entire channel section would be through very fine sand which is unstable when saturated. Past experience has proven that side slopes cannot be maintained without protection.

Silt cannot be completely eliminated from flow in these channels though it will be materially reduced. Channel shape cannot be controlled to maintain adequate velocity under varied flow. From these facts it is evident that in low flows an earth channel would act as a silt storage area and in order to maintain an adequate channel section for flood flows it would be necessary to remove the silt accumulation after each storm. The cost of this silt removal would be a maintenance cost above the ability of local farmers to finance. For these reasons the idea of unprotected channels was discarded as not being an effective solution within the financial ability of farmers to maintain.

Based on observation of maintenance efforts in the past on a 3000 foot section of East Cebada, silt removal has cost approximately a dollar a foot of channel. Assuming this same unit cost for the comparable section of Cebada, maintenance cost for this item of silt removal would be approximately \$6,000 annually which is above the ability of the farmers to pay over an indefinite period of time.

The 3000 feet of East Cebada above the highway is an excellent example of what an unprotected earth channel will do even when the major silt contributing area of the watershed has been adjusted in land use to reduce silt movement to a minimum. The silt source is the channel itself. The above estimated maintenance cost is as much now as it was at any time during the past ten years. This amount has not actually been expended because the farmers could not afford to do the needed work and have had to take chances on not having an adequate channel size at all times. This has resulted in frequent overflows with resulting damage to crops and land.

In considering pipe and wire side and bottom stabilization for East Cebada Channel it was determined, as indicated above, that the silt source is in the channel sides. Pipe and wire will solve this problem and managed vegetation will take over when the pipe and wire are no longer effective, providing permanent control with reasonable maintenance. This type of construction is cheaper than concrete lining and will, therefore, be included when the work plan is developed in detail.

The reason for not combining Cebada with East Cebada in the latter channel at or above the highway is that the lower mile of East Cebada is causing no trouble with very little maintenance although the balance appears to be very delicate. To disturb this balance by enlarging the channel and greatly increasing the flow could easily throw this mile of channel out of balance and thereby force expensive protection of this channel reach.

The degrading of Cebada Channel and war time construction of the Camp Cook Highway have placed the grade control point of Cebada Channel at the point of possible diversion 26' below the surrounding field level. This would require an extremely large channel across the adjacent field in order to match the grade in East Cebada Channel.

The possibility of using the "Four Corners" area as a debris basin was discarded for a combination of reasons:

1. The area proposed is the present deposition area receiving the major present damages which the program is intended to protect. This alternate, therefore, did not appeal to farmers and District Directors.

2. It would require the purchase of 88 acres of farm land at a present sale value of \$3,000 per acre or \$24,000 which cannot be purchased from Flood Control funds under the present authorization.

Based on observation of maintenance efforts in the past on a 3000 foot section of East Cebada, silt removal has cost approximately a dollar a foot of channel. Assuming this same unit cost for the comparable section of Cebada, maintenance cost for this item of silt removal would be approximately \$6,000 annually which is above the ability of the farmers to pay over an indefinite period of time.

The 3000 feet of East Cebada above the highway is an excellent example of what an unprotected earth channel will do even when the major silt controlling area of the watershed has been adjusted in land use to reduce silt movement to a minimum. The silt source is the channel itself. The above estimated maintenance cost is as much now as it was at any time during the past ten years. This amount has not actually been expended because the farmers could not afford to do the needed work and have had to take chances on not having an adequate channel size at all times. This has resulted in frequent overflows with resulting damage to crops and land.

In considering pipe and wire side and bottom stabilization for East Cebada Channel it was determined, as indicated above, that the silt source is in the channel sides. Pipe and wire will solve this problem and managed vegetation will take over when the pipe and wire are no longer effective, providing permanent control with reasonable maintenance. This type of construction is cheaper than concrete lining and will, therefore, be included when the work plan is developed in detail.

The reason for not combining Cebada with East Cebada in the latter channel at or above the highway is that the lower mile of East Cebada is causing no trouble with very little maintenance although the balance appears to be very delicate. To disturb this balance by enlarging the channel and greatly increasing the flow could easily throw this mile of channel out of balance and thereby force expensive protection of this channel reach.

The degrading of Cebada Channel and war time construction of the Camp Cook Highway have placed the grade control point of Cebada Channel at the point of possible diversion 26' below the surrounding field level. This would require an extremely large channel across the adjacent field in order to match the grade in East Cebada Channel.

The possibility of using the "Four Corners" area as a debris basin was discarded for a combination of reasons:

1. The area proposed is the present deposition area receiving the major present damages which the program is intended to protect. This alternate, therefore, did not appeal to farmers and District Directors.
2. It would require the purchase of 88 acres of farm land at a present sale value of \$3,000 per acre or \$264,000 which cannot be purchased from Flood Control funds under the present authorization.

The estimated cost of this alternate include:

Excavation	- - - -	122,600 Yds.	.25	\$ 30,650
Embankment	- - - -	55,300 Yds.	.30	16,590
Pipe and Wire	- - - -	7,500 L. Ft. 3'	2.00	15,000
Pipe and Wire	- - - -	9,750 " " 7'	2.50	24,375
Right-of-way	- - - -	14 Acres	300	4,200
Debris basin site	- -	88 Acres		26,400
Cone	- - - - -	1,365 Cu. Yds.	60.00	81,900
Miscellaneous	- - - -			
streams (bridges)	- -	2 each	5000	<u>10,000</u>
				\$ 209,115

This debris basin would require maintenance and eventually would require silt removal, however, no estimate of this cost was made because it was rejected for the other reasons, primarily lack of support by local people.

At this stage it was concluded that the solution of the water and debris problems would include combining Purisima and Cebada channels in either a concrete lined channel or an earth channel with pipe and wire side and bottom protection, or, to leave these channels as they are at present on the assumption that the major damage is caused by silt and the farmland treatment, gully control and debris storage in the gully will reduce this damage to a minimum.

The estimated cost of a concrete lined channel is shown here:

Excavation	- - - -	75,200 cu. yds.	.25	\$18,800
Reinforced Concrete	- -	7,875 cu. yds.	40.00	315,000
Miscellaneous structures				
(Bridges & Outlet Drop)	- - - - -			7,750
Right-of-way	- - - - -	9 acres at \$200	- - - - -	1,800
Contingencies 15%	- - - - -			<u>51,500</u>
Total	- - - - -			\$395,850

The unit costs shown here are not adequate for present construction, but it is expected that before the end of the 10 year construction period that such cost can be secured under contract.

At present prices this estimate would be as follows:

Excavation	- - - - -	75,200 cu. yds.	.30	\$22,560
Concrete	- - - - -	7,875 cu. yds.	60.00	472,500
Miscellaneous struct.	- - - - -			10,000
Right-of-way	- - -	9 acres at \$300	- - - - -	2,700
Contingencies	- - - - -			<u>76,160</u>
Total	- - - - -			\$583,920

The estimated cost of this alternate includes:

Excavation	122,600 Yds.	\$25,112
Embankment	25,300 Yds.	16,290
Pipe and Wire	7,500 L. Ft. 3'	15,000
Pipe and Wire	9,750 " " 7'	24,375
Right-of-way	14 Acres	4,200
Debris basin site	88 Acres	26,400
Concrete	1,365 Cu. Yds.	81,900
Miscellaneous		
Stream (bridges)	2 each	10,000
		\$209,112

This debris basin would require maintenance and eventually would require silt removal, however, no estimate of this cost was made because it was rejected for the other reasons, primarily lack of support by local people.

At this stage it was concluded that the solution of the water and debris problems would include combining Portaine and Cebada channels in either a concrete lined channel or an earth channel with pipe and wire side and bottom protection, or, to leave these channels as they are at present on the assumption that the major damage is caused by silt and the farmstead treatment. Gully control and debris storage in the gully will reduce this damage to a minimum.

The estimated cost of a concrete lined channel is shown here:

Excavation	75,200 cu. yds.	\$18,800
Reinforced Concrete	7,875 cu. yds.	315,000
Miscellaneous structures		
(Bridges & Outlet Drop)		7,750
Right-of-way	9 acres at \$200	1,800
Contingencies 15%		21,200
Total		\$395,850

The unit costs shown here are not adequate for present construction, but it is expected that before the end of the 10 year construction period that such cost can be secured under contract.

At present prices this estimate would be as follows:

Excavation	75,200 cu. yds.	\$22,560
Concrete	7,875 cu. yds.	472,500
Miscellaneous structure		10,000
Right-of-way	9 acres at \$200	2,700
Contingencies		16,160
Total		\$523,920

Estimated cost for pipe and wire side protection with concrete bottom stabilizers:

Excavation - - - - -	338,250 cu. yds. @	\$101,475
Reinforced concrete - - - -	2,700 cu. yds. @ 45.00	124,650
Miscell. Culv. & Bridges etc.	28,500	28,500
Pipe and Wire Revetment - -	23,800 L. Ft. @ 2.00	47,600
Rights-of-way - - - - -	30 Acres @250.00	7,500
Contingencies, 15% - - - - -		<u>40,275</u>
Total - - - - -		\$350,000

The above unit costs are estimated as being possible within the next 10 years. If constructed under 1946 conditions this total would be exceeded by approximately \$100,000.00.

By delaying the construction of this unit for five to eight years it is possible that changed conditions on the watershed and in the gullies will materially modify the needs for channel protection as well as providing more favorable unit prices for such construction as is needed at that time.

At this stage of planning no contacts have been made with State and County Highway Departments to determine what contribution may be made by them. It is expected, however, that both will contribute to the extent of constructing such road crossings as are needed or approximately one half of the miscellaneous structure items shown in these tabulations.

It is also expected, though not definitely known, that at least a part of the rights-of-way will be donated by benefiting farmers and some purchased by locally donated funds.

Estimated cost for pipe and wire side protection with concrete bottom stabilizers:

Excavation	338,250 cu. yds. @	\$101,475
Reinforced concrete	2,700 cu. yds. @ 45.00	124,500
Miscell. Culv. & Bridges etc.	28,500	28,500
Pipe and Wire Revetment	23,800 L. Ft. @ 2.00	47,600
Rights-of-way	30 Acres @ 250.00	7,500
Contingencies, 15%		40,275
Total		\$350,000

The above unit costs are estimated as being possible within the next 10 years. If constructed under 1946 conditions this total would be exceeded by approximately \$100,000.00.

By delaying the construction of this unit for five to eight years it is possible that changed conditions on the watershed and in the gullies will materially modify the needs for channel protection as well as providing more favorable unit prices for such construction as is needed at that time.

At this stage of planning no contacts have been made with State and County Highway Departments to determine what contribution may be made by them. It is expected, however, that both will contribute to the extent of constructing such road crossings as are needed or approximately one half of the miscellaneous structure items shown in these tabulations.

It is also expected, though not definitely known, that at least a part of the rights-of-way will be donated by benefiting farmers and some purchased by locally donated funds.

The unit costs shown here are not adequate for present construction, but it is expected that before the end of the 10 year construction period that some unit costs can be reduced under contract.

At present prices this estimate would be as follows:

Excavation	338,250 cu. yds. @	\$101,475
Reinforced concrete	2,700 cu. yds. @ 45.00	124,500
Miscellaneous structure	28,500	28,500
Pipe and Wire Revetment	23,800 L. Ft. @ 2.00	47,600
Rights-of-way	30 Acres @ 250.00	7,500
Contingencies, 15%		40,275
Total		\$350,000

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Estimated cost for pipe and wire side protection with concrete bottom
retainers:

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Excavation - - - - -	12,500 cu. yds. @	1.00	12,500.00
Reinforced concrete - - - - -	2,500 cu. yds. @ 47.00		117,500.00
Miscell. Equip. & Supplies - - - - -	28,000		28,000.00
Pipe and Wire Retainer - - - - -	22,800 L. Ft. @ 2.00		45,600.00
4. Information on Alternates for Santa Ynez, B1 and A3			
San Miguelito Channel - Area A3 - - - - -			

The above cost estimates are for the proposed project. The actual cost may vary due to changes in the project or in the cost of materials and labor. The estimated cost for the project is \$193,600.00.

San Miguelito Channel - Area A3 - - - - -
Crop Land - - - - -
Range Land - - - - -

Alternate No. 1 and No. 2 - - - - -
Santa Rosa Sub-watershed, B1P - - - - -
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Information on Alternates Considered in Developing Reconnaissance
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Santa Ynez River Watershed

San Miguelito Channel - Area A-3

The original survey plan for this channel consisted of enlarging the present channel and excavating a new channel to provide a waterway to the river for excess flow. Since the enlargement of the existing channel would finally outlet flood water on meadowland some distance from the river or other defined water course, and no provision was made to control flood waters below this point, it was not felt that complete solution of the flood problem was made. In order to dispose of this flood water in the shortest, most economical alignment the channel was realigned along the shortest practicable route to the river. While this increases the quantity of excavation in new channel construction, it eliminates considerable distance of channel enlargement and reduces the total cost as well as giving positive definition of all flood water to the river.

Breakdown of cost for this work is:

Channel excavation, 41,300 c.y. @ .35	- - - - -	\$ 14,450
Dike for Debris Basin, 700 c.y. @ .35	- - - - -	2,450
Grade Control Structures, 3 @ \$11,550	- - - - -	34,650
Channel Lining - Restricted Section @ \$60 - 625 c.y.	- - - - -	37,500
Channel Crossings, 5 @ \$3,500	- - - - -	17,500
1 Railroad @	- - - - -	6,000
1 Highway @	- - - - -	6,000
Right-of-way, 23 acres @ \$1,000	- - - - -	23,000
		<u>141,550</u>
	Contingency - - - - -	21,230
	Total - - - - -	<u>\$162,780</u>

No contacts have been made with farmers, city officials, County, State or railroads to determine extent of local financing.

It is expected that some right-of-way will be donated by directly affected farmers, and that the City of Lompoc will contribute toward right-of-way purchase. State and County road departments and the railroad (Southern Pacific) will be asked to finance the crossing of their properties.

Assuming 50% success in donation of right-of-way, and that highway and railway crossings are financed by owners, the above estimate would be reduced by \$36,780 or to a total figure of \$126,000.

Any further reduction in total cost of this work would depend on unit costs at the time bids are let, as this estimate is based on 35¢ excavation and \$60.00 concrete which are present prices.

Information on Alternates Considered in Developing Reconnaissance
for
Santa Ynez River Watershed

San Miguelito Channel - Area A-3

The original survey plan for this channel consisted of enlarging the present channel and excavating a new channel to provide a waterway to the river for excess flow. Since the enlargement of the existing channel would finally outlet flood water on meadowland some distance from the river or other defined water course, and no provision was made to control flood waters below this point, it was not felt that complete solution of the flood problem was made. In order to dispose of this flood water in the shortest, most economical alignment the channel was realigned along the shortest practicable route to the river. While this increases the quantity of excavation in new channel construction, it eliminates considerable distance of channel enlargement and reduces the total cost as well as giving positive definition of all flood water to the river.

Breakdown of cost for this work is:

Channel excavation, 41,300 c.y. @ .35	\$ 14,450
Dike for Delta Basin, 700 c.y. @ .35	2,450
Grade Control Structures, 3 @ \$11,550	34,650
Channel lining - Restricted Section @ \$60 - 625 c.y.	37,500
Channel Crossings, 5 @ \$3,500	17,500
1 Railroad @	6,000
1 Highway @	6,000
Right-of-way, 23 acres @ \$1,000	23,000
Contingency	141,750
Total	\$162,780

No contacts have been made with farmers, city officials, County, State or railroads to determine extent of local financing.

It is expected that some right-of-way will be donated by directly affected farmers, and that the City of Los Angeles will contribute toward right-of-way purchase. State and County road departments and the railroad (Southern Pacific) will be asked to finance the crossing of their properties.

Assuming 50% success in donation of right-of-way, and that highway and railway crossings are financed by owners, the above estimate would be reduced by \$36,780 or to a total figure of \$126,000.

Any further reduction in total cost of this work would depend on unit costs at the time bids are let, as this estimate is based on 35¢ excavation and \$60.00 concrete which are present prices.

San Pasqual and Rodeo Channels - Area A-3

At present, Rodeo Channel is defined to a point just below the State Highway. Below this point, flood water spreads over the agricultural land in sheet flow.

San Pasqual Channel passes under the State Highway and railroad, then follows along the north side of the railroad to a natural slough. At the end of the natural slough, flood waters from San Pasqual channel spread over cultivated lands.

The original survey plan for these channels consisted of combining them below the railroad and enlarging and extending the present channel of San Pasqual along the north side of the railroad down to pasture land where it was planned to spread the water. No defined water course was planned below this point. Here again no definite water disposal plan was made. Revision of this plan consists of combining the two channels in a debris basin on the upper side of the State Highway then carrying the combined channel under the State highway and railroad to the Santa Ynez River in the shortest practicable route.

Breakdown of costs for this work is:

Channel excavation, 61,950 c.y. @ .35	- - - - -	\$ 21,700
Dike for debris basin, 15,000 c.y. @ .35	- - - - -	5,250
Grade control structures 2 @ \$11,550	- - - - -	23,100
Channel lining - restricted sections, 3 @ \$12,250	- - - - -	36,750
Bridges - 1 highway @ \$6,000	)	
1 railroad @ \$6,000	) - - - - -	19,000
2 farm roads @ \$3,500	)	
Right-of-way Channel - - - - - 23.4 Ac.)		
Debris Basin- - - 12.6 Ac.)	36 Ac. @ 1,000--	<u>36,000</u>
		\$141,800
Contingency - - - - -	- - - - -	<u>21,270</u>
Total - - - - -	- - - - -	\$163,070

When clearance of the program is received an effort will be made through the Lompoc Soil Conservation District to secure local support in a financial way to cover rights-of-way and public road crossings as a minimum. On the same assumption as for San Miguelito, these figures would be reduced by \$30,000 or to \$133,000.

Santa Rita Sub-watershed - (Bla)

This drainage area has a common boundary on the west with the east boundary of East Cebada and drains a section of the north side of the Santa Ynez Valley.

It is quite similar in topography, soils, rainfall, climate and land use to Cebada to the west and Santa Rosa to the east.

San Pascual and Rodeo Channels - Area A-3

At present, Rodeo Channel is defined to a point just below the State Highway. Below this point, flood water spreads over the agricultural land in sheet flow.

San Pascual Channel passes under the State Highway and railroad, then follows along the north side of the railroad to a natural slough. At the end of the natural slough, flood waters from San Pascual channel spread over cultivated lands.

The original survey plan for these channels consisted of combining them below the railroad and enlarging and extending the present channel of San Pascual along the north side of the railroad down to pasture land where it was planned to spread the water. No defined water course was planned below this point. Here again no definite water disposal plan was made. Revision of this plan consists of combining the two channels in a debris basin on the upper side of the State Highway then carrying the combined channel under the State Highway and railroad to the Santa Ynez River in the shortest practicable route.

Breakdown of costs for this work is:

Channel excavation, 61,950 c.v. @ .35	\$ 21,700
Dike for debris basin, 15,000 c.v. @ .35	5,250
Grade control structures 2 @ \$12,500	25,100
Channel lining - restricted sections, 3 @ \$12,250	36,750
Bridges - 1 highway @ \$6,000	
1 railroad @ \$6,000	12,000
2 farm roads @ \$3,500	
Right-of-way Channel - - - - - 23.4 Ac.) 36 Ac. @ 1,000--	36,000
Debris Basin - - - - - 12.6 Ac.)	
Contingency - - - - -	\$141,800
Total - - - - -	\$163,050

When clearance of the program is received an effort will be made through the Tempe Soil Conservation District to secure local support in a financial way to cover right-of-way and public road crossings as a minimum. On the same assumption as for San Miguelito, these figures would be reduced by \$30,000 or to \$133,000.

Santa Rita Sub-watershed - (Bia)

This drainage area has a common boundary on the west with the east boundary of East Cebada and drains a section of the north side of the Santa Ynez Valley.

It is quite similar in topography, soils, rainfall, climate and land use to Cebada to the west and Santa Rosa to the east.

The main drainage alternates between deep vertical sided gullies and debris deposit areas where the channel is inadequate or completely nonexistent.

The major source of debris comes from the active gully headings and side caving in the deep gully sections with minor silt contributions from poor condition range and from farm land inadequately protected during the rainy season.

The treatment of these lands in aid of flood control and for erosion control having secondary flood control values will include, but not necessarily be limited to, the following practices and measures.

Range Land

Fencing, seeding, water development rotation and deferred grazing, proper stocking and fencing for total exclusion from use.

Crop Land

Conversions to less intensive use in accordance with capability of the land. Crop rotations to include soil building crops. Crop residue utilization to increase infiltration rate.

Subsoiling and basin listing for reduction in surface runoff and increased soil moisture for crop and pasture production. Contour furrowing; diversion ditches; terracing and terrace outlets; gully plantings and seeded waterways.

The total cost of establishing these practices and measures is estimated to be approximately \$52,000. Fifty five percent of this cost is expected to be supplied by farmers on a basis of on-site benefits and 45% to be from Flood Control funds for off-site benefits in silt reduction and reduced runoff.

Structural control of channels and deposition areas.

The basis for estimating the cost of grade stabilization was to determine the total vertical fall in excess of estimated stabilization grade of 0.5%.

This total excess of drop is 807 feet which includes the main channel and unstable tributary channels through cultivated land.

The table given below indicates the cost by channel reaches for establishing adequate channel section by excavation and checking to a stable grade by reinforced concrete drop structures.

The main drainage alterations between deep vertical sided gullies and debris deposit areas where the channel is inadequate or completely nonexistent.

The major source of debris comes from the active gully headings and side leaving in the deep gully sections with minor silt contributions from poor condition range and from farm land inadequately protected during the rainy season.

The treatment of these lands in aid of flood control and for erosion control having secondary flood control values will include, but not necessarily be limited to, the following practices and measures.

Range Land including the use of brush and debris from the upper side of the Redwood Highway when carrying the channel through the brushy area. Fencing, seeding, water development rotation and deferred grazing, proper stocking and fencing for total exclusion from use.

Crop Land

Channel excavation, 21,750 cu. yd. @ \$2.00 = \$43,500.00. Conversions to less intensive use in accordance with capability of the land. Crop rotations to include soil building crops. Crop residue utilization to increase infiltration rate.

Subsiding and basin lifting for reduction in surface runoff and increased soil moisture for crop and pasture production. Contour furrowing; diversion ditches; terracing and terrace outlets; gully plantings and seeded waterways.

The total cost of establishing these practices and measures is estimated to be approximately \$22,000. Fifty five percent of this cost is expected to be supplied by farmers on a basis of on-site benefits and 45% to be from Flood Control funds for off-site benefits in silt reduction and reduced runoff. The balance of the program is expected to be covered by a Federal off. clearance of the program is expected to secure local support in a financial. The total cost of the program is expected to be covered by a Federal off. clearance of the program is expected to secure local support in a financial. Structural control of channels and deposition areas.

The basis for estimating the cost of grade stabilization was to determine the total vertical fall in excess of estimated stabilization grade of 0.25%.

This total excess of drop is 807 feet which includes the main channel and unstable tributary channels through cultivated land.

The table given below indicates the cost by channel reaches for establishing adequate channel section by excavation and checking to a stable grade by reinforced concrete drop structures.

RECONNAISSANCE SURVEY

Santa Rita Watershed Area Bla - Complete Control

Sub-Area	Net Lift For New Structures	Cost Per Foot of Lift	Channel Excavation Feet	Cost Per Foot For Excavation	Head Controls Cost at \$225 each	Total Cost
Bla1	110'	\$1155	10,000	\$2.00	\$ 900	\$147,950
Bla2	125'	250	0	-	900	32,150
Bla3	315'	250	800	1.00	675	80,225
Bla4	257'	300	1,800	1.50	1,350	81,150
Total - - - - -						\$341,475

Two alternate possibilities were considered:

1. To assume grade stabilization of .75% for a heavily vegetated channel and install temporary pipe and wire checks to take up 25% until this vegetation is established.
2. The installation of over-pour structures or chutes at the head of each of three active gully heads and over-pour type of terrace outlet structures for side drainage.

Below is the estimated cost of these alternates:

RECONNAISSANCE SURVEY

Santa Rita Watershed Area B1a - Complete Control

Area Structures	Excavation	Excavation	Head Controls	Total Cost
Blas 110'	10,000	\$2.00	900	\$147,950
Blas 125'	250	0	900	32,150
Blas 315'	250	1.00	675	80,225
Blas 257'	300	1.50	1,350	81,150
Total				\$341,475

Two alternate possibilities were considered:

1. To assume grade stabilization of .75% for a heavily vegetated channel and install temporary pipe and wire checks to take up 25% until this vegetation is established.

2. The installation of over-pour structures or chutes at the head of each of three active gully heads and over-pour type of terrace outlet structures for side drainage.

Below is the estimated cost of these alternates:

The total cost of establishing these structures and measures is estimated to be \$341,475. This cost is based on the assumption that the channel is to be stabilized by the installation of a series of over-pour structures and wire checks to take up 25% until this vegetation is established. The total cost of establishing these structures and measures is estimated to be \$341,475. This cost is based on the assumption that the channel is to be stabilized by the installation of a series of over-pour structures and wire checks to take up 25% until this vegetation is established.

Alternate No. 1

Sub-Area	Net Lift	Cost Per Unit	Sub-Total:	Total
<u>Bla1</u>				
Reinf. Conc. Drops	59 ft.	:\$1155 per vert. ft.	\$ 68,145	
Pipe & Wire Cks.	51' - 2550 L.F.	: 200 per vert. ft.	10,200	
		:\$4.00 per L. F.		
Channel Excav.	7000 cu. yds.	:\$2.00 per cu. yd.	14,000	
Channel Vegetation	15 A; 13,500' x 50	:\$300 per acre	4,500	
Head Control Str.	4 each	:\$225 each	900	\$97,745
<u>Bla2</u>				
Concrete drops	85'	:\$250 per vert. ft.	21,250	
Pipe & Wire Cks.	40'	:\$100 per vert. ft.	4,000	
		:\$4.00 per Lin. ft.		
Vegetation	15 A; 27,000 L. ft.	:\$300 per acre	4,500	
Head Control Strs.	4 each	:\$225 each	900	\$30,650
<u>Bla3</u>				
Reinf. Conc. Drops	280	:\$250 per vert. ft.	70,000	
Pipe & Wire Cks.	35	:\$100 per vert. ft.	3,500	
Channel Excav.	800 cu. yds.	:\$1.00 per cu. yds.	800	
Vegetation Control	18,000; 10 Ac.	:\$300 per acre	3,000	
Head Control Strs.	3 each	:\$225 each	675	\$77,975
<u>Bla4</u>				
Concrete checks	210	:\$300 per vert. ft.	63,000	
Pipe & Wire chks.	47	:\$100 vert. ft.	4,700	
Excavation	1800	:\$1.50 cu. yds	2,700	
Vegetation	17 A; 30,000	:\$300 per acre	5,100	
Head Control Str.	6	:\$225 each	1,350	\$76,850
				\$283,220

Alternate No. 2

3 Reinforced concrete chutes at \$24,000 each - - - - -	\$72,000
(This includes excav. and backfill)	
17 Head Control structures at \$225 each - - - - -	3,825
+ 15% contingencies approx. - - - - -	11,375
Total - - - - -	\$ 87,200

Alternate No. 1

Sub-Area	Net Lift	Cost Per Unit	Sub-Totals	Total
Blas				
Reinf. Conc. Drops	52 ft. - 2520 L.F.	\$11.25 per vert. ft.	58,142	
Pipe & Wire Cks.	51' - 2520 L.F.	200 per vert. ft.	10,200	
		\$4.00 per L.F.		
Channel Excav.	7000 cu. yds.	\$2.00 per cu. yd.	14,000	
Channel Vegetation	15 A; 13,500' x 50'	\$300 per acre	4,500	
Head Control Str.	4 each	\$225 each	900	\$97,742
Blas				
Concrete drops	85' - 8500	\$250 per vert. ft.	21,250	
Pipe & Wire Cks.	40' - 8500	\$100 per vert. ft.	4,000	
		\$4.00 per L.F.		
Vegetation	15 A; 27,000 L.F.	\$300 per acre	4,500	
Head Control Str.	4 each	\$225 each	900	\$30,650
Blas				
Reinf. Conc. Drops	280	\$250 per vert. ft.	70,000	
Pipe & Wire Cks.	35	\$100 per vert. ft.	3,500	
Channel Excav.	800 cu. yds.	\$1.00 per cu. yd.	800	
Vegetation Control	18,000; 10 Ac.	\$300 per acre	3,000	
Head Control Str.	3 each	\$225 each	675	\$77,975
Blas				
Concrete checks	210	\$300 per vert. ft.	63,000	
Pipe & Wire cks.	47' - 4700	\$100 vert. ft.	4,700	
Excavation	1800 cu. yds.	\$1.50 cu. yds.	2,700	
Vegetation for cks.	17 A; 30,000	\$300 per acre	5,100	
Head Control Str.	6	\$225 each	1,350	\$76,850
				\$283,220

Alternate No. 2

3 Reinforced concrete chutes at \$24,000 each	72,000
(This includes excav. and backfill)	
17 Head Control structures at \$225 each	3,825
15% contingencies approx.	11,375
Total	\$87,200

Alternate No. 1 appears to have some merit based on the effect of vegetation in channels as observed in Orange County, California. Possibly the investigational work at California Institute of Technology will indicate the soundness of this possibility by the time a final choice of controls must be made.

The estimated cost of establishing vegetative growth includes initial planting plus reinforcement plantings and careful management for approximately four years after which nominal maintenance immediately adjacent to the structures should be adequate.

Alternate No. 2 contemplates only arresting active gully headings and relying on heavy annual maintenance costs to establish additional grade controls as needed. It is our considered opinion that final permanent control with nominal maintenance will be found only by complete channel grade stabilization in a channel adequate in size to carry expected flows such as shown in the original proposal as submitted or Alternate No. 1.

Santa Rosa Sub-watershed (Blb)

This subwatershed is very similar to Santa Rita. The problems and proposed controls apply to both. The cost of controls will differ only because of the greater vertical distance between control points. The cost estimate of the three methods considered is given below.

Sub-Area	Complete Control						
	:Net Lift	: Cost Per	: Channel	: Cost Per	:Head Controls:		
	:For Struc- :tures	: Foot of : Lift	: Excava- : tion Ft.	: Ft. of : Excav .	:at \$225 : Each	: Total	: Cost
Blb1 (Main)	: 112	: \$1155	: 0	: 0	: (5) 1125	: 130,485	
Blb2 (L. Fork)	: 95	: 400	: 3,500	: 1.00	: (5) 1125	: 42,625	
Blb3 (Drum)	: 345	: 600	: 5,000	: 1.00	: (7) 1575	: 213,575	
Blb4 (Crawford)	: 430	: 300	: 5,000	: 1.00	: (3) 675	: 134,675	
Total	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	\$521,360

Alternate Plan No. 1

Excavate and revet channel through present deposition area in East Fork just above main channel. Plant 3 acres of unstable gully and install 20 pipe over-fall head controls:

5000 ft. P. & W. revetment @ \$2.00	- - - - -	\$10,000
P. & W. stabilizers - 8 @ \$1000	- - - - -	8,000
Channel excavation 2500' @ \$1.20	- - - - -	3,000
Plant 3 acres of gully @ \$500	- - - - -	1,500
20 head controls @ \$225	- - - - -	4,500
Total	- - - - -	\$27,000

ALFONSO

Santa Rosa Sub-watered (Bbb)

Control este

Alternate Plan No. 1

\$27,000	Total - - - - -
4,500	20 head controls @ \$225 - - - - -
1,500	Plant 3 acres of gully @ \$500 - - - - -
3,000	Channel excavation 250' @ \$12.00 - - - - -
8,000	P. & W. stabilizers - 8 @ \$1000 - - - - -
\$10,000	5000 ft. P. & W. revetment @ \$2.00 - - - - -

Alternate No. 2

This could be identical with Alternate No. 1 described for Santa Rita, i.e., substitute temporary pipe and wire checks and vegetative plantings for approximately $1/3$ of the lift taken up with concrete in the proposal. Since there is 175 feet of drop more in Santa Rosa and its active tributaries than in Santa Rita (982' and 807') the cost of taking up the surplus will be greater.

If alternate No. 2 is used in place of the tabulated proposal, the cost would be reduced by approximately \$88,600 to \$432,760 for structural treatment of channels.

The farmland and range land treatment in aid of flood control and for soil conservation practices and measures having secondary flood control benefits is estimated to be approximately \$51,000. Sixty percent of this cost is expected to be supplied by farmers for on-site benefits and 40% for Flood Control funds for off-site benefits.

Palos Blancos - Blc

The major source of damage from this sub-watershed is from run-off which has no channelization at the lower end. It is proposed to provide farmland and watershed treatment to reduce the amount of run-off and thereby avoid costly channel protection.

It is estimated that the total program on this area will cost \$16,500 of which \$3,900 will be from Flood Control funds for off-site benefits and \$12,600 will be expended by farmers on a basis of on-site benefits and conservation.

SANTA YNEZ FLOOD CONTROL PROJECT

Cost Summary of Proposed Flood Control Measures and Practices on All Units

Watershed	Channels	Farm Land		Totals
		Federal	Farmer	
Purisima	\$ 17,635	\$ 7,214	\$ 4,705	\$ 29,554
Cebada	112,832	11,722	5,228	129,782
East Cebada	32,372	2,729	962	36,063
Lower Cebada	350,000			350,000
San Miguelito	163,000			163,000
San Pasqual-Rodeo	163,000			163,000
Santa Rita	387,025	20,210	8,700	415,935
Santa Rosa	595,210	16,758	6,850	618,818
Falos Blancos		3,905	1,975	5,880
	1,821,074	\$62,538	\$28,420	\$1,912,032
		Less Total Farmer		28,420
		Total Federal		\$1,883,612



DR06 218

SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE

WATERWAYS DIVISION

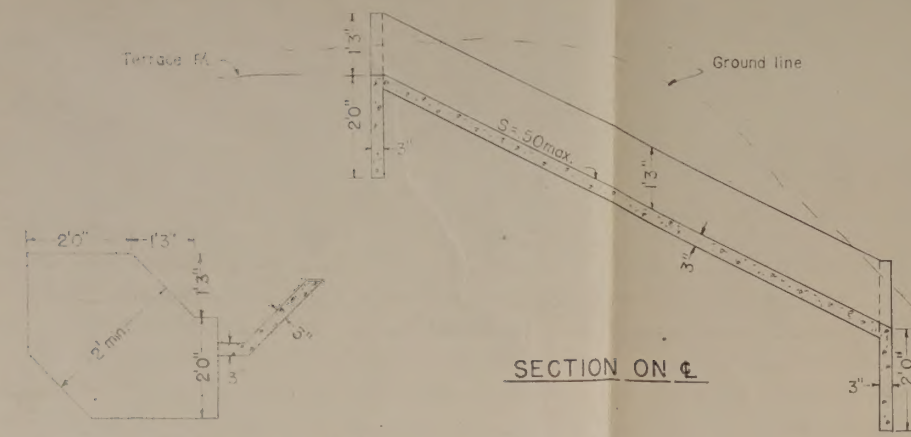
TECHNICAL STRUCTURES

Form 1

ELEVATION

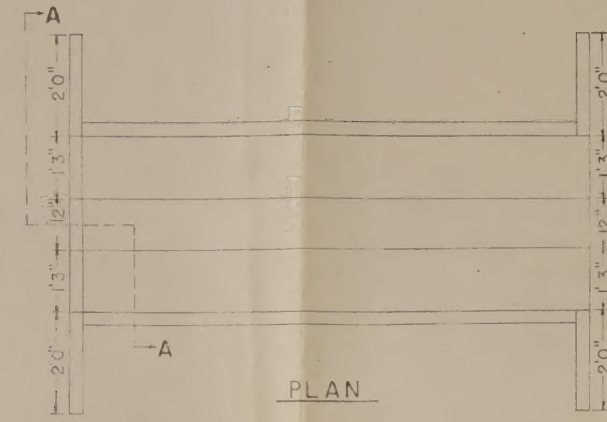
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SECTION A-A

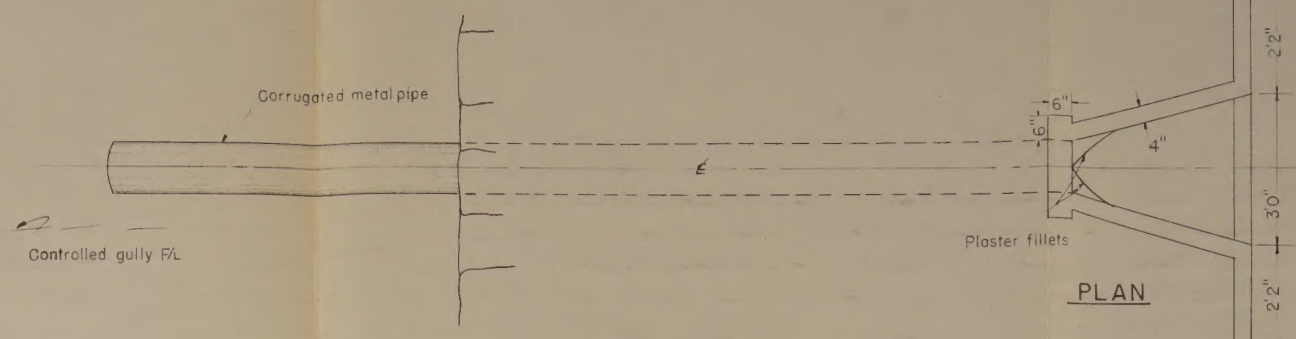
SECTION ON C



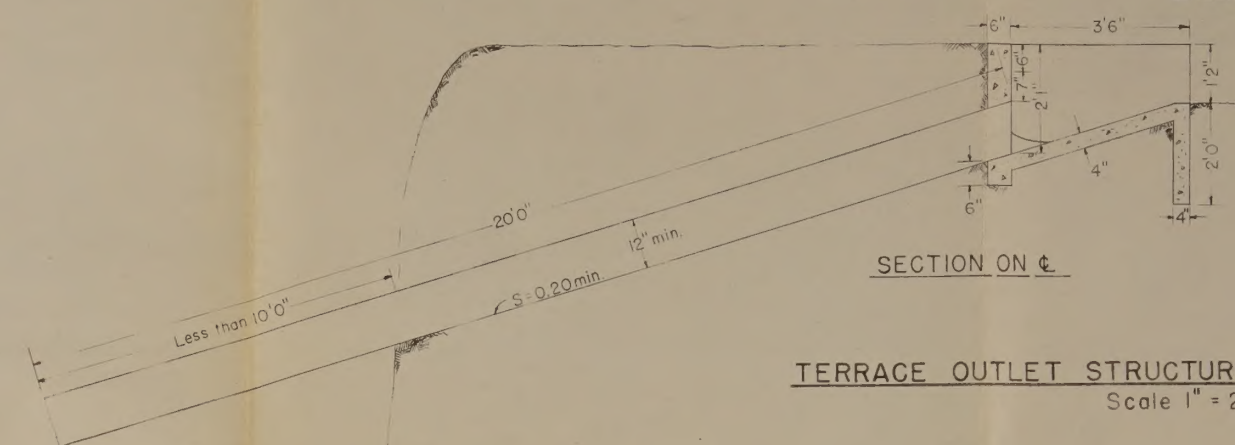
PLAN

TERRACE OUTLET STRUCTURE-CHUTE TYPE

Scale 1" = 2'0"



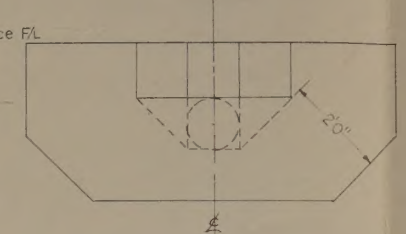
PLAN



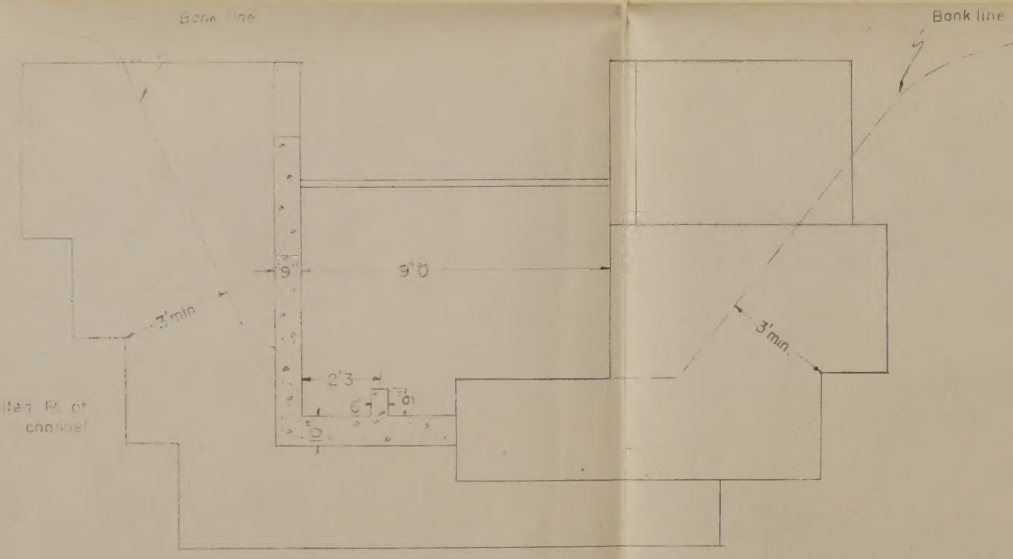
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TERRACE OUTLET STRUCTURE-PIPE OVERFALL TYPE

Scale 1" = 2'0"



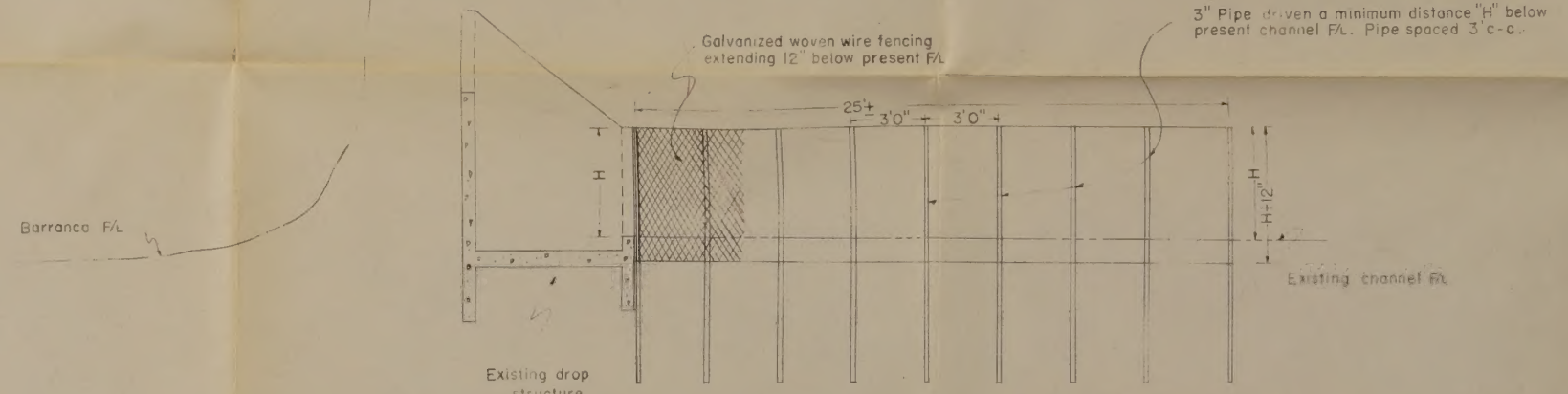
UPSTREAM ELEVATION



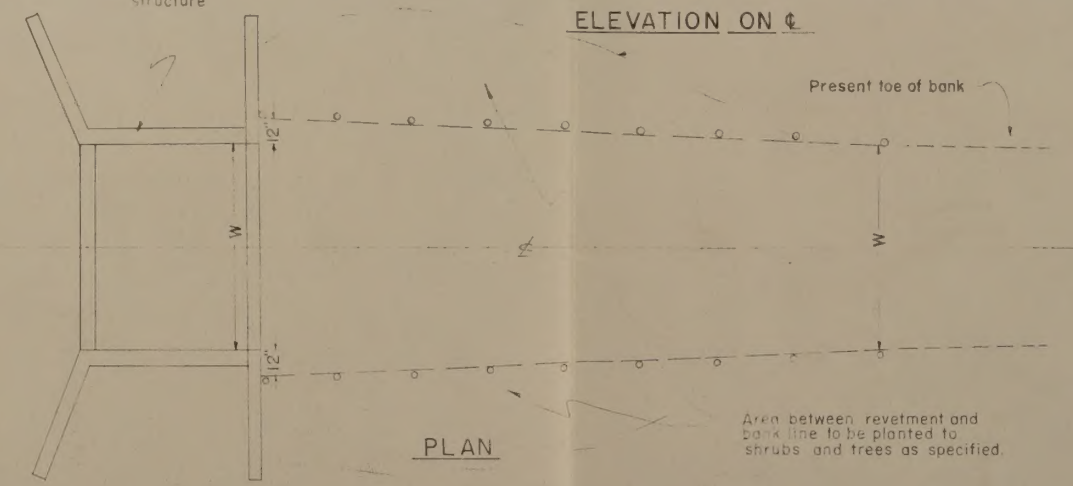
SECTION A-A

TYPICAL DROP STRUCTURE

Scale 1" = 3'0"



ELEVATION ON C



PLAN

REINFORCEMENT FOR EXISTING DROP STRUCTURES

Scale 1" = 1'4"

REGION 7				
TYPICAL STRUCTURES				
AREA A-7 SANTA YNEZ RIVER				
U. S. DEPARTMENT OF AGRICULTURE				
SOIL CONSERVATION SERVICE				
H. H. BENNETT, CHIEF				
REFERENCE:				
CARTOGRAPHIC APPROVAL:		TECHNICAL APPROVAL:		
COMPILED:	TRACED:	CHECKED:	DATE:	DRAWING NO.
C.C.R.				1.

24 11 322

10-12

Channel IV

Flex Selo

24 11 322

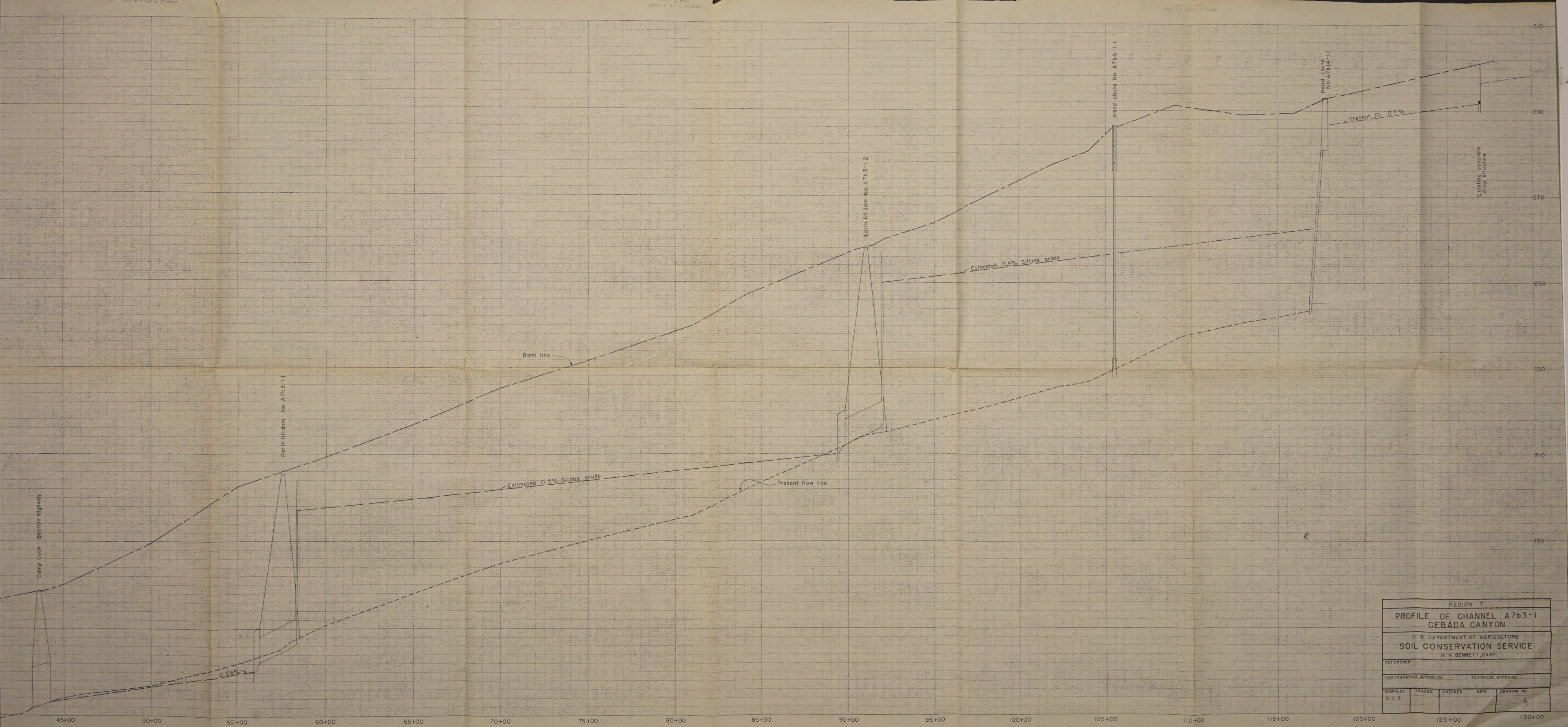


ACTY
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er to be
leaving with side
side to be brought
outside stop logs

IMPOUNDING CAPACITY	
Spillway Crest - Elevations in feet.	Cumulative impounding capacity in acre feet
225.0	3.1
233.5	14.6
239.5	29.0
244.0	43.1
247.0	54.6
250.0	67.5

REGION 7				
EARTH FILL DAM				
STRUCTURE NO. A7b3-1.2				
CEBADA CANYON			Max Q = 800cfs	
U. S. DEPARTMENT OF AGRICULTURE				
SOIL CONSERVATION SERVICE				
H. H. BENNETT, CHIEF				
REFERENCE:				
CARTOGRAPHIC APPROVAL			TECHNICAL APPROVAL	
COMPILED: C. C. R.	TRACED:	CHECKED:	DATE	DRAWING NO.



REGION 7				
PROFILE OF CHANNEL A7b3-1				
CEBADA CANYON				
U. S. DEPARTMENT OF AGRICULTURE				
SOIL CONSERVATION SERVICE				
H. W. BENNETT, CHIEF				
REFERENCE				
CARTOGRAPHIC APPROVAL		TECHNICAL APPROVAL		
COMPILED	TRACED	CHECKED	DATE	DRAWING NO.
C.C.R.				6

